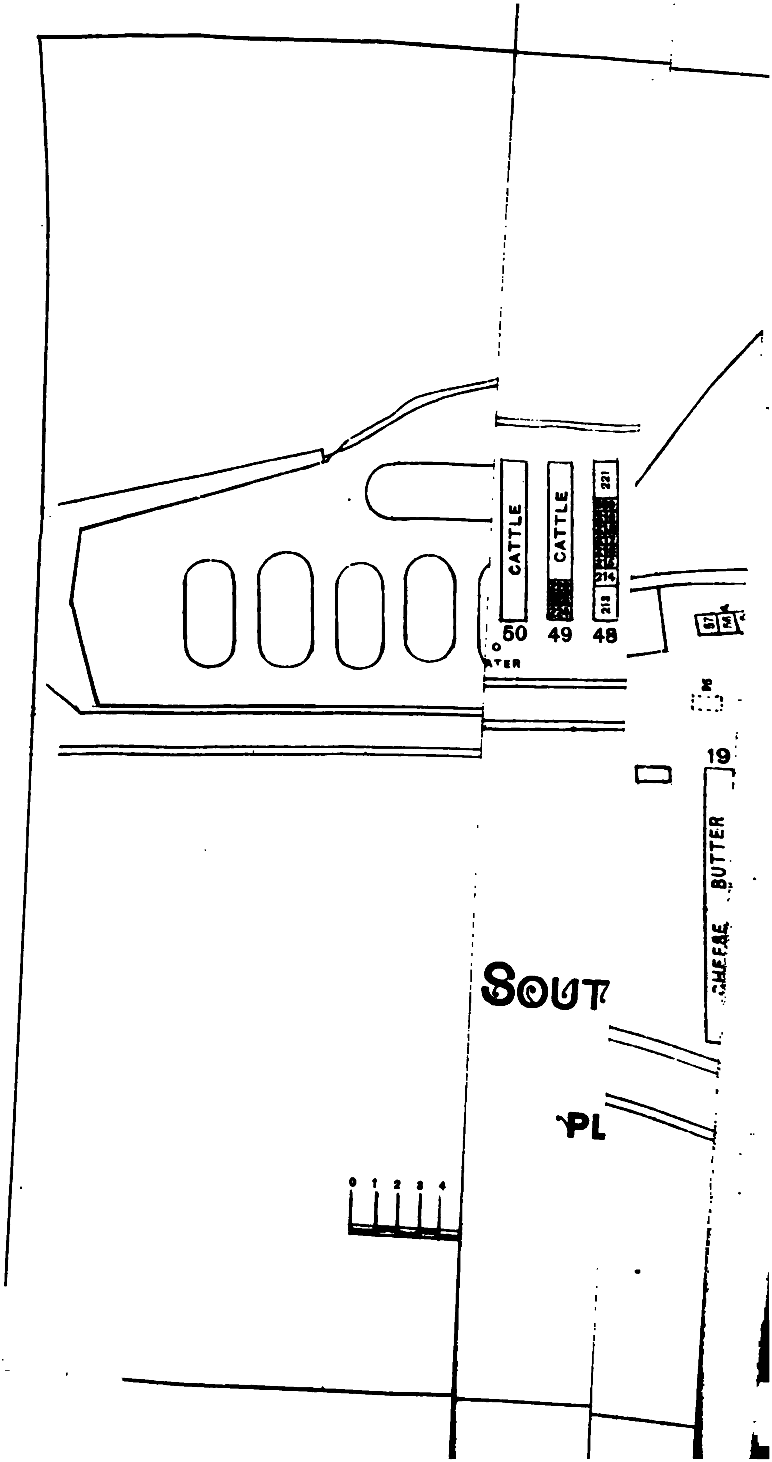

CATTLE
CATTLE
221
214
218
50
49
48
19
BUTTER
SOUT
PL
0 1 2 3 4

JOURNAL

OF THE

TH AND WEST AND SOUTHERN COUNTIES SOCIETY.

FOURTH SERIES.

VOL. III.

1892–93.

WORK AND LEARN.

/14

LONDON:
DWARD STANFORD, 26 & 27, COCKSPUR STREET,
CHARING CROSS, S.W.
1893.

Price to Non-Members, Six Shillings.

"He that goes about to forward agricultural improvement must begin by finding out the t reasons of what is called routine, or the 'custom of the country.' It sometimes happens that th reasons are only accidental, and then you may dismiss them fearlessly; but often it turns out t every-day practice rests on a solid foundation of facts; and then if you make an onslaught on lo prejudices, they will be sure to beat you.

"The true course for the agricultural improver is, to take one step at a time, to gain a clear insi into facts by experience, not to try to go too fast, and to trust to the work of time.

"If practice which sets up to do without theory is contemptible, theory without practic foolhardy and perfectly useless."—*From the Rural Economy of England, Scotland, and Irela* by LEONCE DE LAVERGNE.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, STAMFORD STREET
AND CHARING CROSS.

CONTENTS.

VOLUME III.—FOURTH SERIES. 1892–3.

PROCEEDINGS OF THE SOCIETY.

APPENDIX.

Swansea Meeting, 1892.

Privileges, Laws, Officers, &c.

Gloucester Meeting, 1893.

Finance.

JOURNAL

OF THE

BATH AND WEST AND SOUTHERN COUNTIES SOCIETY.

Proceedings of the Society.

SWANSEA MEETING, 1892.

I.—*Report of the Council presented to the Annual General Meeting of Members held on June 3, 1892.*

THE Council, in submitting their Annual Report, again congratulate the members upon the continued prosperity of the Society.

Finances.

The financial result of the Bath Meeting, and the success which, during the past year, has attended the Society's operations generally, have enabled the Council to make a further investment of 2000*l.* in Government and Colonial Stock, and to place 500*l.* on deposit with the Society's Bankers. The Society's invested capital now amounts to 18,000*l.*

Membership.

During the past year there has been a satisfactory increase in the roll of Membership, which stands at 1310, as against 1269 last year.

Deaths and Resignations.

The Council regret that the ranks of the Vice-Presidents have been thinned by the deaths of the Duke of Cleveland, the Duke of Devonshire, the Earl of Portsmouth, Viscount Hampden (who so ably occupied the presidential chair in 1885), the Right Hon. W. H. Smith, Sir Alexander Acland Hood, Bart., and Mr. J. E. Knollys. A special tribute is due to the memory of the last named, who was so long and intimately identified

with the Society and its work, and by whose death it experi ences no ordinary loss. As Chairman of some of its most in portant Committees, he rendered untiring and invaluable servic and was conspicuous in his advocacy of all that tended to wide the Society's area of usefulness, whilst his tact and judgme were equalled by his kindliness and geniality.

Elections.

Three extraordinary vacancies in the Council have been fill up by the election of Mr. C. R. Knollys, the Rev. L. E. Swe and Mr. H. W. Taylor.

Dairy Schools.

During the past year the Society has continued and extend its efforts to promote practical education in Dairying through t medium of its Schools, and its activity in this direction h been stimulated by the calls which have been made upon it l various public bodies.

Under an arrangement with the Somerset County Counc who have made, for a second year, a grant of 1000*l.* for t purpose, one of the Society's travelling Butter Schools is co tinuing its visits to various centres in the county, and a fix Cheese School has been opened at Axbridge.

Travelling Butter Schools have also been provided by t Society, in response to applications from County Councils, i Herefordshire, Surrey, Kent and Glamorganshire, and anotl will shortly commence in Dorsetshire.

The need for skilled and systematic investigations with ref ence to dairying, has been, for some time, recognised by th who have given attention to the subject, and the Council ha utilised the Society's Cheese School, both at Frome and Axbrid for the conduct of experiments in this direction, in accorda with a scheme prepared by the Chairman of the Society's Ag cultural Education Committee, Sir R. H. Paget, Bart., M.P. laboratory and a scientific expert (Mr. F. J. Lloyd, F.C.S.) w a qualified assistant have been attached to the School, a the Society's Consulting Chemist (Dr. J. A. Voelcker, F.C. and its Consulting Botanist (Mr. W. Carruthers, F.R.S.) ha rendered valuable aid by examining and reporting upon t constituents of the soil and upon the grasses.

The results which have been already obtained, and are par cularised in the recent issue of the Society's Annual Journ have thoroughly satisfied the Council of the value of th investigations.

'he Board of Agriculture has once more borne testimony to utility of the work carried on by the Society's Dairy Schools awarding a grant in aid of 500*l.* Such a recognition has n a great encouragement, and has enabled the Council to ;age more actively in the work than it otherwise could have ie.

Experiments.

n the Experimental Department a series of experiments has n successfully conducted with the object of ascertaining what nures can be most advantageously used for mangolds, having ard also to their effects on a succeeding crop of corn. It was isidered desirable to test the results obtained from similar)eriments in 1890 by a repetition of them, so that the ex- imental work of the past year comprises the records of the ld of corn grown on the previous year's mangold-plots, as ll as returns of the growth of mangolds from last year's nurings. The Board of Agriculture has been pleased to re- nise the importance of this work by a grant in aid of 150*l.*

[wo sets of experiments are in progress for the current year, object in one set being to ascertain what artificial manures be used with advantage in improving the herbage of old tures, and, in the other, the effect of salt as an addition to :ate of soda for top-dressing barley. To meet the cost of se, the Council have made a special grant of 300*l.*

Swansea Meeting.

'he present Exhibition of Stock is not so large as usual, the nbers in the Cattle classes having been affected by the recent breaks of foot-and-mouth disease, but the Sheep classes have y rarely been so well filled.

'he entries of Dairy Produce are well above the average, and increasing popularity of the competitions for butter-workers hown by the fact that there are no less than 175 entries, as inst 145 last year, which was the largest number up to that e.

'he Working Dairy is on the same extensive scale as last year, i every effort has been made, by the provision of daily ures and demonstrations, to increase its usefulness as a lium for instruction in dairying.

[he exhibits coming under the head of Implements, Art-Manu- ;ures and Paintings are also very satisfactory in point of nbers, and the Special Prizes for Knitting have attracted rly 100 entries, whilst the Shoeing Smiths again muster l. Among other features of the present exhibition is a Bee-

tent, where, under the auspices of the British Bee-kee Association, instruction, with explanatory illustrations, is g in Bee-culture.

For the first time a special pavilion, in which are incluc reading and writing room, lavatory, &c., has been provide the Show Yard for the use of members of the Society, and proposed to continue this at future meetings.

The Council have especial pleasure in acknowledging friendly co-operation of the Glamorganshire Agricultural So which has this year suspended its Annual Show and contril 100*l.* in Special Prizes. A Prize of the value of 20*l.* has been added by its President. Your Council felt that they v be acting in accordance with the feelings of the members rally if they conferred members' privileges, with respec entries and admission tickets, upon the members of the Gla ganshire Society, and this has accordingly been done.

The Council has also gratefully to acknowledge the recei Special Prizes amounting to 200*l.* from the Swansea Local mittee, and others of varying amounts from the President c Society, the English Jersey Cattle Society, the Shropshire S Breeders' Association, the Hunters' Improvement Society Messrs. Parry and Rocke.

The Future.

The Council have pleasure in announcing that they accepted an invitation to hold the Annual Meeting next y Gloucester.

They have much pleasure in recommending that Lord hardinge be elected President for the ensuing year; th Duke of Devonshire and Sir J. T. D. Llewelyn, Bart., be e Vice-Presidents; and that, in recognition of the great se so long and ably rendered to the Society by Col. Luttrell, he be elected an Honorary Life-Governor and Vice-Preside

They beg to recommend the following for election as Me of Council for the years 1892–94, in room of those retiri rotation:—

EASTERN DIVISION.—J. H. Arkwright, T. Danger, H. house, M.P., C. R. Knollys, M. St. John Maule, H. B. N R. Neville-Grenville, Capt. J. D. Sherston, and E. W. Wil

WESTERN DIVISION.—C. R. Collins, J. H. Ley, R. M S. P. Newbery, J. D. Pratt, Sir J. Shelley, Bart., Sir Williams, Bart., R. Wippell, and Col. A. Wyatt-Edgell.

SOUTHERN DIVISION.—Col. G. Best, A. F. M. Dru Goring, A. Grenfell, G. Simpson, A. Stanford, F. War Whitehead, F.L.S., and A. G. Williams.

Without Reference to District.—J. D. Allen, E. H. Llewellyn, Baron Llangattock, G. E. Martin, C. D. Phillips, and H. D. Skrine.

Thanks.

The Council desire to express their thanks to the Mayor of Swansea, the Members of the Local Committee, and the inhabitants of the town and neighbourhood generally, for the cordiality with which they have welcomed the Society, and the energy they have displayed in promoting the success of the Meeting.

Appeal for Members.

In conclusion, the Council would earnestly impress upon each individual member of the Society the desirability of making an effort to increase the roll of membership, and of bringing home to others, and especially to tenant farmers, the advantages the Society offers. The recent extension of its area of operations renders it absolutely essential that its income should be fully maintained; but, beyond this, an increasing membership affords substantial evidence of vitality, which is, in itself, a source of influence and strength.

II.—*Report on the Proceedings at the Swansea Meeting*, 1892.

By R. Henry Rew.

The District Visited.

Although the Society had twice previously held its exhibition in Glamorganshire, its visit to Swansea was a breaking up of new ground, and a further stretch than heretofore of the long arm of its influence. In 1858, and again in 1882, the Show was held at Cardiff, while in 1888, when it was held at Newport, practically the same district was covered. In bridging over the distance between Cardiff and Swansea, however, an entirely new neighbourhood was entered, and the pastoral region of South Wales was more directly brought within the ever-widening sphere of the Society's operations.

The county, whose connection with the Society was thus ratified, is certainly one of the most interesting in its area. Its mineral wealth and commercial activity are famous, while, although, to a large extent, the farmer has to give way to the miner and the manufacturer, agriculture is practised over much of its surface with enterprise and success. Glamorganshire is,

with one exception (that of Carmarthenshire), the largest county in the principality, but little more than half of its area is under cultivation, and of this three-fourths are permanent pasture. That the corn land is, as a rule, well farmed, is proved by the fact that the average yield of wheat and oats is higher than in all but two of the Welsh counties, while the average yield of barley is higher than in any other county of Wales. It is, however, chiefly in grazing and dairying that the farmers of Glamorganshire are interested, and though, at present, their land does not carry so large a proportion of stock as that of some other counties in the principality, this is no doubt partly attributable to the fact that the cattle, being generally kept for milk production, are of a larger breed than those kept, for example, in Carmarthenshire or Pembrokeshire.

General Features of the Exhibition.

The Showyard at Swansea was picturesquely situated on a narrow strip of land running parallel with the high road to the far-famed "Mumbles." The site occupied was formed by the combination of a public park, a recreation ground, and a cricket field. These three natural sections into which the Showyard was divided were allotted, respectively, (i.) to the implements, dairy, and general departments, (ii.) to the horses, and (iii.) to the cattle, sheep, and pigs. The Show, as a whole, was up to the average, though it was, in most respects, rather smaller than that at Bath in the previous year. The entries of cattle fell below the usual numbers, but this was perhaps partly attributable to the natural uneasiness of stock-owners caused by the outbreak (happily, as events proved, speedily suppressed by the Board of Agriculture) of foot-and-mouth disease. The collection of live stock, on the whole, however, compared favourably with that gathered at Newport in 1888, as, although there were fewer cattle and horses, there were more sheep and pigs than on that occasion.

The various departments of the Show are referred to in the following pages. An interesting and novel feature was the collection of native flannel and specimens of knitting, which formed an appropriate part of the Art Manufactures department. An addition to the conveniences of the Showyard was a reading and writing room for the use of members of the Society.

It may be noted that, for the first time for many years, the catalogues of the stock and implement departments were bound together, and sold at the price hitherto charged for each separately. This alteration was made, at the request of the Society's Council, by the contractors (Messrs. Lewis and Son) to meet the

onvenience of the public generally, and also, in particular, to atisfy the wishes of exhibitors in the implement department.

The Opening.

The Show opened on Wednesday, June 1st, and closed on Monday, June 6th. The formal ceremony of opening took place at ten o'clock inside the chief entrance to the Showyard. The Mayor of Swansea (Mr. Alderman Mason), wearing his robes of office, accompanied by the officials of the Corporation and a large number of aldermen and councillors, performed the function. On reaching the Showyard the Mayor was received by the President of the Society (Sir J. T. D. Llewelyn, Bart.), and a number of Stewards and Members of Council. The Secretary having read the resolution of the Council, inviting the Mayor to open the Show—

The Mayor said:—" Sir John Llewelyn and gentlemen,—I, with much pleasure, accept the honour of opening the Exhibition to-day, and, in doing so, I give a hearty reception, on behalf of the Corporation of Swansea and the burgesses of this ancient borough, to the Bath and West and Southern Counties Society. It has visited one part of Wales before, and now I am extremely glad it has come so far west as on this occasion. I hope and trust this may be a very satisfactory meeting. We all know that, for many years past, the agriculture of this country has had a great deal to contend with—including the great foreign competition, perhaps not always a fair one to us, and other influences. But, by means of this and kindred societies, such a knowledge of the science and practice of agriculture has been brought to us that our position is not nearly so disadvantageous as it otherwise would have been. I would allude to one matter I think of particular interest to Wales. A travelling butter school was established by this Society in 1888, and from that time, according to the report at the end of 1891, fifteen counties and thirty-seven different cities or towns, have been visited while something like 800 students have passed through those schools to the satisfaction of the Society. Now, as we all know, the Principality of Wales is a favourable one, so far as soil is concerned, for butter making, and I would impress on all the people in this district concerned in agriculture the necessity of taking particular interest in the dairy section of this Show, where lectures will be delivered and illustrations will be shown to them during the next five days such as will be of great value to them. As I said, the soil is excellent for butter making, much of it being on limestone; and we all know that good butter is produced upon such a formation. The success of this

Society will be the means, I hope, of their honouring us with another visit in due time. I have very much pleasure indeed in declaring this Show open."

Sir John Llewelyn, as President of the Society, said:—"Mr. Mayor, Gentlemen of the Corporation, and visitors to the ground,—On behalf of the Bath and West and Southern Counties Society, I thank you, and especially my old friends the Corporation, for your presence to-day and for coming in such large numbers. I quite agree with you, Mr. Mayor, and I believe all the members of the Society will agree, that the object of the Society is to do good and provide both technical and practical knowledge with regard to agriculture, where we look for improvement in farm work generally. Specially does the necessity lie in the direction of the dairy; not in butter-making alone, but in the other and varied ways where dairy values may be made more satisfactory, both in point of remuneration and quality, as it affects the consumer as well as the producer, in which way it may be of advantage to farmers. In how to use the produce there is a great deal to be learnt. I don't quite agree with the Mayor in regard to the soil. No doubt we have to deal, in some parts, with the limestone soil; but there are many who live on the red sandstone. Upon this has been attracted the large masses of population who are the consumers of our produce. Now, this carboniferous sandstone soil is not suited to the production of cereals. It is suited, rather, for dairying purposes, though in a lesser degree than the limestone soils. We who depend on the produce of farms have all to learn the way a greater produce can be obtained from the land we cultivate; and, if our efforts are to be of any service, let us beg the intelligent attention of the population to the dairying work done by the Society. In the working dairy of this show-yard admirable accommodation is provided, there are more entries than previously, and I fully believe there will be a very large attendance of the public to see the work and hear the lectures, for there is no single item of agricultural knowledge that requires more attention. There is every prospect of a successful Show, and I hope we may look forward to a very large attendance, and that what will be seen will be of benefit to all. I thank the Mayor and Corporation for coming here to give welcome to the Society, and his Worship for opening the Show."

This concluded the actual business of the occasion, but advantage [illegible] the opportunity was taken to present Sir J. T. D. Llewelyn [illegible] an address of welcome on his return from Egypt, [illegible] congratulation at his occupation of the presidency of the Show and of thanks for his services to Swansea during his recent Mayoralty.

e Mayor, who made the presentation, said it was a small ento from a few of his friends and admirers in Swansea. ddress, which was admirably illuminated, and contained a ess of Sir John Llewelyn besides local views, was framed od cut from Sir John's Penllergare estate.

reply, Sir John Llewelyn said the presentation came on as a very great surprise. He thanked the subscribers for kind expressions, and, with respect to his recent visit to ot, he said that he had been able to learn there a good deal t agriculture and horticulture, but he must confess that his rvations had not satisfied him that the breeding of cattle improved since the days of the Pharaohs. If the sculptures ie fat bulls of Bashan were accurate, they had far finer ials then than at the present day.

The Attendance.

is always a matter of doubt how far the tapping of a new ict may prove successful from a financial point of view. On one hand the Show is a novelty, and may, therefore, attract ction of the public to whom agriculture *per se* does not ially appeal; while, on the other hand, the Society has to end against the fact that its fame may not be so widely nded as in districts which it has previously visited. All ts, however, as to the character of the "gate" were soon elled at Swansea, and in the end an unqualified success scored. The following statement will be convenient for parison :—

	Visitors.						Receipts.
	1st Day.	2nd Day.	3rd Day.	4th Day.	5th Day.	Total.	£
77	2,357	8,266	17,002	34,365	14,487	76,477	5,961
1878	3,881	2,081	6,452	19,378	7,617	39,409	2,958
879	2,007	3,014	9,613	33,015	7,518	55,167	3,899
r, 1880 ..	1,002	2,021	5,392	19,786	17,889	46,090	2,904
ge Wells, 1881	3,166	3,381	6,821	22,184	11,052	46,604	3,374
1882	5,667	6,151	12,123	30,817	7,863	62,621	5,030
ter, 1883 ..	1,445	5,034	10,692	27,279	3,962	48,412	3,813
ie, 1884 ..	5,028	3,926	4,547	22,636	8,417	44,554	3,226
, 1885 ..	1,744	2,898	4,995	25,683	14,168	49,488	3,094
1886	4,999	9,417	15,164	43,183	27,816	100,579	7,225
er, 1887 ..	1,790	2,968	4,102	24,813	5,033	38,706	2,611
(Mon.), 1888	2,421	7,402	5,035	15,654	22,913	53,425	3,844
1889	3,415	7,215	5,775	17,141	19,054	52,600	3,891
r, 1890 ..	1,634	1,846	17,172	19,764	7,898	48,314	2,663
91	4,057	7,109	12,344	28,090	24,095	75,695	5,575
, 1892	3,516	7,267	7,581	23,249	31,494	73,107	5,164

It will be seen that, in point of attendance, the Exhibition of 1892 takes rank among the foremost on record. It has, in fact, only been beaten, in the matter of visitors, by the Shows held at Bristol and Bath, and it stands considerably ahead both of Cardiff and Newport. No doubt this gratifying result is partly attributable to the weather, which, except on the first shilling day, was fine throughout the time of the Show, and thus contrasted happily with the meteorological misfortune which so often dogs the Society's footsteps.

The Live Stock.

The following is a tabulated statement of the number of entries of live stock at Swansea, and at the four preceding Shows:—

	Newport, 1888.	Exeter, 1889.	Rochester, 1890.	Bath, 1891.	Swansea, 1892.
Horses:—					
Agricultural	38	31	29	52	31
Hunters, Hacks, Ponies, and Harness	92	118	28	121	70
	— 130	— 149	— 57	— 173	— 101
Cattle:—					
Devons	36	64	19	53	25
Shorthorns	80	38	38	64	47
Herefords	58	56	46	37	37
Sussex	39	48	49	35	20
Jersey	122	152	126	226	118
Guernsey	63	68	82	69	25
Black Welsh	28	..	..	..	24
Any Breed	9	2	11	..	21
	— 435	— 428	— 371	— 484	— 317
Sheep	160	182	231	234	249
Pigs	85	78	85	127	113
Totals	810	837	744	1018	780

Taken on the whole, the collection of live stock was, numerically, scarcely up to the average, the deficiency in the cattle classes being specially marked. This was to some extent made up by the unusually large number of entries in the sheep classes. As regards the general character of the stock, it can only be said here that it was acknowledged, on the whole, to show no falling off. The reports handed in by the Judges will be left, as in former years, to speak for themselves without any amplification.

Horses.

For Agricultural Purposes.—There were 31 entries in the ight classes for agricultural horses, being the same number as t Exeter in 1889, and seven less than at Newport in 1888. ust twenty of the horses entered were Shires, seven were lydesdales, and the remainder were undescribed in the atalogue.

The following report on this section was handed in by one of he Judges, Mr. T. Chapman:—

My Report upon the Agricultural horses at Swansea cannot be very favourable. The classes generally were badly filled, and in many instances the quality was indifferent.

Class 1. *Stallions foaled before* 1890.—First prize [Mr. J. A. Barr's "*Nailstone Challenger*" (13,378)] was a good-coloured useful 3-yr. old.

Class 2. *Stallions travelling regularly in S. Wales during* 1892.—First rize went to a neat little 3 yr. old [Miss Talbot's "*Tullyallon*," (9,455)] ith small head, scarcely denoting growth enough.

Class 3. *Stallions foaled in* 1890.—Only one prize awarded; a really good nimal, and likely to make a good sire [Mr. Barr's "*Nailstone Royal tamp*"].

Class 4. *Colts foaled in* 1891.—Better as regards numbers, but an indifferent lot, only two prizes awarded.

Classes 5 & 6. *Mares with or in foal.*—Only one in each class, but mares kely to breed something useful.

Class 7. *Fillies foaled in* 1889.—A really good lot; big roomy fillies, and ke making serviceable brood mares.

Class 8. *Fillies foaled in* 1890.—Better competition. First prize was warded to a chestnut [Mr. Buckley's "*Blyth Marigold*"] very small and ood quality, but a little wanting in substance. The other two prizes were ell earned by good bay fillies.

Hunters.—There were 70 entries in the light horse classes, a umber, which, if not particularly large, was at any rate better han on some previous occasions. It will be seen that one of he Judges, Mr. Knott, whose report follows, considered the eneral quality to be good.

The hunter classes, although short in number, were very good generally.

Class 10. *Mares or Geldings, foaled in* 1888.—Of the seven 4-yr. olds exhibited several were good, but the first prize horse [Mrs. Hoare's "*Seakale*"] especially so. He was a fine specimen of a well-bred, weight-carrying young hunter.

Class 11. *Fillies or Geldings, foaled in* 1889.—The 3-yr. olds were also a good class, some of which were of high quality, and will doubtless be heard of again.

Class 12. *Fillies or Geldings, foaled in* 1890.—Nine put in an appearance, a number of which were fine youngsters, particularly those that took the first [Mr. Wilkinson's "*Puritan*"] and second [Miss Powell's "*Roderick Dhu*"] prizes.

Class 13. *Fillies or Colts, foaled in* 1891.—The competition in this Class was good. Nine came into the ring, and the first prize [Mr. Budd's "*Lady Fife*"] was a remarkably fine filly.

Class 14. *Mares with or in foal.*—Only three were shown, but two of them were exceptionally fine mares. The foals were but moderate.

Hacks.—Class 15. *Mares or Geldings over* 14·2 *hands.*—Five animals appeared, several of which were very good-looking, but lacking in action. The first [Mr. John's "*Lord Windsor*"] and second [Mr. Clifton's "*Duchess of York*"] prize-winners, however, were fine movers, with good manners.

Class 16. *Mares or Geldings not over* 14·2 *hands.*—Only two came before us, but both had grand action, good looks, and manners, and we felt quite justified in recommending that a second prize should be given.

Ponies.—Class 17. *Mares or Geldings not over* 13 *hands.*—The same may be said as of Class 16.

Class 18. *Mares or Geldings not over* 12 *hands.*—Very moderate; there were but two, and neither of them very remarkable.

Harness.—Class 19. *Mares or Geldings over* 14 *and not over* 15·2 *hands.*—Seven shown, and amongst them were several very grand harness horses.

Class 20—*Mares or Geldings over* 13 *and not over* 14 *hands*—was represented by seven, three or four of which had remarkably fine action, and good manners.

Class 21. *Mares or Geldings not over* 13 *hands.*—Only one [Mr. Milton's "*Bantam*"] was shown in this, but a very good one, which quite deserved the first prize.

Cattle.

The entries in the cattle classes, as has been previously remarked, were fewer than on any recent occasion, the total number being 317 as compared with 484 at Bath, and 435 at Newport.

Devons.—It was scarcely to be expected that this breed would muster strongly, and there were less than half the number of entries which appeared at Bath, though on the other hand there were more than at Rochester.

Mr. J. D. Pratt made the following report:—

Distance from home had, doubtless, much to do with the scarcity of entries under this head, there being 25 only. Nevertheless the Society were favoured with some splendid specimens. In making our awards we were mainly guided by that uniformity in type, shape, and touch, which unmistakably mark true breeding.

Class 22—*Bulls calved in* 1888 *or* 1889.—First prize, Sir W. Williams's "*Pretty Middling.*" This splendid Bull fully upholds his previous reputation as the Champion Devon of his day—criticism in this case may be summed up in one word, perfection—whilst Mr. Howse's "*Lord Stamborough*" and Mr. Lethbridge's "*Bravo Tempter 2nd*" fully deserve the honours awarded them.

Class 23—*Bulls calved in* 1890.—First prize, Mr. J. F. R. Morris's "*Country Gentleman.*" This fine young animal combines size with quality and a good constitution, and is very likely to make his mark hereafter. Sir W. Williams's "*Proper Model*" showed a deficiency across the shoulders, but, in other respects, he displays all the high characteristics of this now famous herd, and we had no hesitation in placing him second. Mr. J. C. Williams's "*Teuton,*" although somewhat diminutive, makes a good third.

CLASS 24—*Bulls calved in* 1891.—First prize [Mr. J. C. Williams's *Applecrop*"] a shapely promising young animal likely to take a high place ı future shows; Mr. Morris's "*Masterman*," a younger animal, comes very ose up as second prize winner; whilst Mr. Stanley's "*Roger*," a still ounger animal, fairly earns the third place.

CLASS 25—*Cows in Milk or in Calf*.—First prize [Mr. Howse's "*Moss Rose*"] an excellent specimen of her class, Mr. Stanley's "*Portrait*" (who ıad her calf to sustain) being a close competitor.

CLASS 26—*Cows in Milk or in Calf, calved in* 1889.—Sir W. Williams's '*Fiction 2nd*." This, the only exhibit here, we confidently proclaim to be the grandest heifer of her day and to be without a fault.

CLASS 27—*Heifers calved in* 1890.—A most meritorious and interesting class headed by Mr. Stanley's "*Moss Rose*," a splendid young heifer combining size with quality and good shape. Sir W. Williams's "*Flame 2nd*" is a trifle patchy, but makes a good second, and after some hesitation we awarded the third prize to Mr. Howse's "*Prolific*," thus placing Mr. Stanley's "*Picture 11th*" on the reserve list.

CLASS 28—*Yearling Heifers*.—A highly meritorious class. First prize, Mr. Stanley's "*Princess Margaret*;" second prize, Sir W. Williams's "*Daisy*;" third prize, Mr. Mucklow's "*Lady Ida*;" reserved, Mr. Morris's "*Daisy 4th*," the whole class being highly commended. We confess to having had more difficulty in making our awards here than in any of the preceding classes, the merits of the different exhibits being so closely balanced; indeed, throughout the whole of our decisions the difficulty in choice lay more with the second and third prizes than with the first.

Shorthorns.—The Show of this breed was fairly large, and better than at Rochester or Exeter, though considerably below that at Newport. The 47 entries were sent by over twenty exhibitors, the local breeders very fairly holding their own in competition with distant herds.

The judges, Messrs. George Garne and James How, reported as follows:—

The Shorthorns were deficient in numbers in several classes, owing, no doubt, to the great risk of sending to Swansea many of the first-class animals that were entered for the Royal at Warwick.

CLASS 29—*Bulls calved in* 1888 *or* 1889—brought five into the ring. Mr. Cookson's "*Judge of Assize*" took first prize, being much the best mover, with great depth of rib and good hind quarters, but rather bare about his shoulders and not having quite a good head. This bull was not pampered up in condition like the second prize white bull [Mr. Handley's "*Duke of Fife*"] which was shown in very high condition. He had a very level top with good quality of flesh and hair, but was deficient in depth of rib, light at flank, and not good thighs. The third prize, Messrs. Harrison's "*Duncan Grey*," had a very symmetrical body, but his head was most objectionable and he was evidently out of health. The Reserve & H. C., Sir H. Vivian's "*Laughton Waterloo*," showed good breeding, and was a very useful bull not in very high condition.

CLASS 30—*Bulls calved in* 1890—Mr. Brierley's "*Stanley*," a good bull, with size and quality, took first prize. Mr. Bond's "*Rosedale Farmer*," much the youngest in the class, came second; he was a very symmetrical nice little bull with good flesh and likely to obtain honours in future. Mr. Handley's "*Magnus*," the third prize-winner, had a good body but was very short from hips to rumps, which were very drooping, and his horns were objectionable.

CLASS 31—*Bulls calved in* 1891.—A very moderate class. Mr. Howell's "*Royal Gwynne*" was first, a tolerably compact level bull, but his horns were rather objectionable. Mr. Lewis's "*Rasselas,*" a rather stylish young bull, had second prize, and Messrs. Harrison's "*Royal Fern,*" a little bull of promising form, took third prize.

CLASS 32—*Cows in Milk or in Calf*—had but three entries and only two prizes were awarded, both of which Mr. Brierley was justly entitled to, the first being "*Softlaw Rose,*" which although she had bred five calves (it was stated) was still a very true grown fine long cow; the second ["*Rosedale Minnie*"] was a grand-looking young cow of great substance and aptitude to fatten, with good quality of flesh but already too gaudy about her rumps.

CLASS 33—*Heifers in Milk or in Calf.*—Only two competed, both of them being in condition to compete at any Christmas fat stock Show. Mr. Brierley's "*Godiva Butterfly*" quite deserved the first honours, and promises to maintain her position when in competition with a very large class. Mr. Howell's "*Milly*" had second prize; she was a good heifer, but too fat for breeding purposes.

CLASS 34—*Heifers calved in* 1890—was well filled, and both the first and second prizes were awarded to Mr. Brierley, "*Rosedale Cherry*" being first and "*Princess*" second; but it was a very close run between the latter and Lord Tredegar's "*Roseleaf,*" which came third. The Marquis of Bute's "*Grateful*" was V. H. C. and Reserve; she was a good heifer and worthy of her position.

CLASS 35—*Heifers calved in* 1891—was the largest class of the breed. Mr. R. Stratton came well to the front with "*Timbrel 23rd*" of exquisite form, beautiful hair, and good flesh. Mr. Brierley's "*Rosedale Minerva*" came in second, and was a young one of great promise. Mr. Cookson's "*Crest*" was placed third, the Reserve and H. C. went to the youngest in the class [Mr. Howell's "*Green Duchess*"].

Herefords.—The number of entries of Herefords was the same at Swansea as at Bath, viz. 37. The judges, Messrs. Francis Evans and T. Chapman Saunders, reported as follows:—

The Classes that came under our notice were not, on the whole, so good as we could have wished to see them, with some exceptions, especially in the young classes, both male and female.

CLASS 36. *Bulls calved in* 1888 *and* 1889.—The old bulls were a small but good Class. The winner [Mr. Arkwright's "*Spring Jack*"] has good character, is solidly made, and we think will hold his own through the Show season. The second prize bull [Mr. Cooke's "*Grove Wilton 4th*"] shows signs of wear and tear, and has, we think, seen his best form.

CLASS 37. *Bulls calved in* 1890.—This Class contained one good animal in Mr. Hughes's "*Albion.*"

CLASSES 39 and 40.—The cows and heifers in-calf, or in milk, were fair specimens of the breed.

CLASS 41. The two-year-old heifers were a small but remarkably good Class. Mr. Green's heifer "*Perilla*" is a superb animal, and Col. Bridgford's "*Sybil*" is a good second.

Sussex.—There were only 20 entries in the Classes for this breed—being the smallest number at any recent Show—and the judges, Messrs. R. Hamshar and A. Stanford, dismiss them in two sentences:—

The Judges regret the small number of the Exhibits, which doubtless was accounted for by the distance from home, as well as by the prevalence of

-and-mouth disease in Kent. Although there was no special feature in stock exhibited, yet this useful breed was well represented by the animals wn in all the Classes.

Jerseys.—Although there was little more than half the mber of Jerseys at Swansea that there was at Bath, the mbers were, practically, equal to those of Rochester and New-rt. Needless to say that they far outnumbered any other eed; and comprised, in themselves, more than one-third of the al display of cattle.

The following is the report of the judges, Messrs. W. Ashcroft d A. T. Matthews:—

Although not quite so numerous as has sometimes been the case, the rsey Classes were fairly well filled. Some of them were strong in numbers, ile the quality, taking it on the whole, was good.

CLASS 50—*Bulls calved in* 1888 *or* 1889—was small, only five being esent. The first prize [Mr. Smart's "*Jupiter*"] was rather too high in ndition, but is very level, straight topped, and has good false teats. The cond prize [Mr. Simpson's "*Bessie's Monopolist*"] was of good quality and h colour, while the third [Lord Rothschild's "*Albany*"] was a lengthy h bull somewhat slack in the back.

CLASS 51—*Bulls calved in* 1890—contained eight fairly good young bulls. 'e found no difficulty in selecting the Earl of Londesborough's "*Grou-lle's Dairyman*" for first place; he was very rich, well-teated, and of good ality, with well-marked escutcheon. The second prize [Mr. Brutton's *Wide Awake*"] looked very like a getter of good dairy stock, while the ird prize went to a very straight and nice handling bull [Mr. Blyth's *Rosy Process*"].

CLASS 52—*Bulls calved in* 1891—was well filled with nineteen animals, aking a very good Class. The first prize went with little hesitation to an ceptionally neat yearling [Lord Rothschild's "*Spots Lad*"]. The second prize imal [Mr. Cornish's "*Bismarck*"] was well marked; the third [Mr. Corbett's *Harry*"], Reserve number [Mr. Simpson's "*Milkman*"], and very highly mmended [Lord Rothschild's "*Flora's Lad*"] ran very close, and several hers in the Class were noticed. Mr. Cornish's "*Kitty's Prince*," commended, ould certainly have taken a higher place, but was not well and had to be nt out of the ring. There were some very promising calves.

CLASS 53—*Cows in Milk or in Calf, calved before* 1889—was a large and od one. Twenty came into the ring, and only a few were not quite up to Show ard standard. The first prize cow [Mr. Blyth's "*Gloire d'Or*"] was aged, d had evidently worked hard, but her almost perfect frame, fine udder, rge milk veins and sweet head carried her to the top in spite of her low ndition. The second prize cow [Mr. Brutton's "*Fairy Elf*"] was of a mewhat different type, larger, and with rather a plain head; she had, wever, a fine frame, and very capacious udder. The third prize fell to a ry fine bred cow [Lord Rothschild's "*Spot*"] of excellent quality lmost too fine), and the reserve number [Lord Rothschild's "*Lily Brown* d"], was also very neat and true. Amongst the highly commended cows r. Cornish's "*Star 2nd*" may be named as especially worthy of notice.

CLASS 54—*Heifers calved in* 1889—brought only seven. Two very fine eifers [Mr Brutton's "*Cicero's Cowslip 5th*" and Lord Rothschild's "*Meggy*"], ith good dairy qualities, headed the class, and were well worthy of their osition; and Mr. Cornish's "*Success*" made a good third, though slightly isfigured with sore teats.

CLASS 55—*Heifers calved in* 1890—was a good class with sixteen cc petitors, amongst which Mr. Corbett's "*Stargazer*" at once claimed prem honours. She has a very sweet head, good udder, and combines fine poi and good constitution in a way we should like to see oftener repeated.] the second prize we selected a rich-skinned, fine-boned heifer [Lord Rot child's "*Crocus*"] with a very capacious udder, but which did not show much stamina as the first prize. The third prize went to a deep-bodi animal [Messrs. Fowler & de la Perrelle's "*Mayfair*"], also of good milki promise.

CLASS 56—*Heifers calved in* 1891—brought eighteen, nearly all promisi youngsters. The first and second prize animals [Mr. Corbett's "*Jessica 2n* and Mr. Cornish's "*Sunshine*"] were somewhat equal in merit, and] Corbett's "*Mab*"—which took third place—was not far behind.

Guernseys.—The collection of this breed was unusual small—mustering only 25 entries—a circumstance for which t judges, Messrs. W. A. Glynn and J. W. Moss, offer an explanati in their report:—

We regret to find a considerable reduction in number of entries. V ascribe this to the long railway journey to reach Swansea, and to regulatio at present in force preventing cattle being returned to the island of Guernse In the cases of single, or only two, entries in a class, we awarded priz according to the merit, in our opinion, of the stock before us. According we awarded a second prize in Class 57 and a third prize in Class 58.

CLASS 58. *Bulls calved in* 1890.—We readily selected Mr. Gibbs's "*Bonn Bairn*" as showing excellent quality and nipples, good body and dept excellent constitution and growth. The third prize [Hon. Mrs. Hamilto "*Jesse 2nd*"] showed quality, but was wanting in size and fell off in t loins.

CLASS 59. *Bulls calved in* 1891.—Mr. Long's "*Oriole*" had every appe ance of getting good dairy stock, and of good quality. Sir F. Montefior "*Lord Worth 2nd*" is a promising calf for his age, of whom we shall probab hear more in future Show Yards.

CLASS 60. *Cows in-Milk or in-Calf.*—The Cow Class, though so very sh in numbers, gave us two excellent cows. Sir F. Montefiore's "*Fortun* shows excellent quality, constitution and shape, with milking power. T Hon. Mrs. Hamilton's "*Rosemary*" merited a second prize as showi excellent quality and milking.

CLASS 61. *Heifers in-Milk or in-Calf, calved in* 1889.—In the Heifer Cl Messrs. Fowler and de la Perrelle's "*Butter Maid 5th*" no doubt would ha been awarded the first prize if she had calved down; but she did not appear the ring under as favourable circumstances as the same exhibitors' "*Carm 4th.*"

CLASS 63. *Heifers calved in* 1891.—Sir F. Montefiore's "*Queen of the Is 4th*" is a promising yearling, and well deserves the first prize awarded to h The third prize [Mr. G. Long's "*Evelyn*"] at eight months of age has gr promise, and will probably come to the front in the future.

The cattle, most of which were evidently looking the worse for a lo railway journey, improved much in appearance during the week of the Sho

Black Welsh.—There were 24 entries of the native breed compared with 28 at Newport. Mr. R. B. Smith, one of t judges, reported as follows:—

CLASS 64. *Bulls calved in* 1888 *or* 1889.—First prize [Mr. Oakley's *Latimer*"] fine, thick, well shaped animal of excellent quality. Second prize Mr. E. Evans's "*Roger*"] useful, fair quality. R. & H. C. [Col. Leach's *Sultan*"] the best of two poor ones.

CLASS 65. *Bulls calved in* 1890.—First prize [Mr. T. E. Thomas's "*Sam*"] good useful animal of fair quality. Second prize [Mr. O. Williams's "*Black Prince*"] fair quality.

CLASS 66. *Bulls calved in* 1891.—First prize [Mr. Oakley's "*Ardudwy*"] thick, well fleshed, well brought out. Second prize [Mr. Greaves's "*Brenin Morfa*"] good form, and quality very promising. Reserve [Mr. D. Jenkins's "*Ap Gruffydd*"], fair quality.

CLASS 67. *Cows in-Milk or in-Calf.*—This was a very good Class. First prize [Mr. Oakley's "*Hatty*"] large, massive frame, fine sample of what a Welsh cow can be made. Second prize [Mr. Greaves's "*Towyn 7th*"] good frame and quality. Third prize [Mr. J. M. Griffiths's "*Rosal 6th*"], a lengthy, fine cow, with good calf at foot. R. & H. C. [Mr. H. Davies's "*Queen*"], useful.

CLASS 68. *Heifers calved in* 1889.—First prize [Major Wynne's "*Flirt*"], a well shaped animal, low in condition.

CLASS 69. *Heifers calved in* 1890.—First prize [Mr. Oakley's "*Truffle*"], thick, well fleshed, good form. Second prize [Major Wynne's "*Primrose*"], lengthy, in low condition.

CLASS 70. *Heifers calved in* 1891.—First prize [Mr. Oakley's "*Llan Mair*"] thick, deep ribbed, good all over. Second prize [Mr. Evans's "*Duchess*"] good quality, fine coat, promising. R. & H. C. [Mr. Greaves's "*Wern Beauty*"], useful.

SHEEP.

The sheep formed, undoubtedly, the most prominent section of the live-stock department. They mustered altogether 249 entries, as against 234 at Bath, and 160 at Newport.

The two judges of Longwools, Messrs. R. Garne and F. Yeandle, presented separate reports, which have been collated:—

Leicesters.—These were well represented both as to numbers and quality. Messrs. Harrison took the great majority of the prizes with well formed sheep of great substance and quality. Mrs. Perry-Herrick's sheep also were of nice form and quality, but much smaller than Messrs. Harrison's.

CLASS 74. *Shearling Rams.*—A very good Class, several of them being remarkably good.

CLASS 75. *Ram Lambs.*—Well worthy of praise.

CLASS 76. *Shearling Ewes.*—Should like to have seen these better represented; the few animals deserved praise.

Cotswolds.—CLASS 77. *Shearling Rams.*—Mr. Swanwick was first with a nice level sheep with good wool and fair quality of mutton. The second [Messrs. Bagnall & Sons] was a big useful sheep, not very heavy in the wool.

CLASS 78. *Ram Lambs.*—A strong Class, headed by a pair of very good lambs of Mr. Thomas's. The second pair [Mr. Hulbert's] were also lambs of good character and promise, as also were two or three other pens in this Class.

CLASS 79. *Shearling Ewes.*—The shearling ewes were well represented, Messrs. Bagnall & Son being first and second with two pens of very good character. The other exhibits were creditable specimens of the breed.

Devon Longwools.—CLASS 80. *Shearling Rams.*—A fine lot of animals with plenty of bone, heavy flesh, and remarkably good fleeces. The first prize sheep of Mr. W. Cook was a grand animal, with good coat, form, and quality of mutton, and standing well on his legs, with a nice well-set-on head. The second prize animal [Sir J. H. H. Amory's] was also of great substance, but not such good form.

CLASS 81. *Ram Lambs.*—Mr. Cook took both prizes with useful animals.

CLASS 82. *Shearling Ewes.* — Would like to have seen them better represented.

Three classes were provided for "other Longwools," but they failed to attract a single entry.

South Downs and Hampshire Downs were judged by Messrs. J. W. Friend and A. Heasman, who reported as follows:—

Southdowns.—The Classes of this breed were well represented considering the distance from home.

CLASS 86—*Shearling Rams*—Mr. A. de Murrieta took the first prize with a very compact sheep; the second prize went to Sir W. Throckmorton for a long level sheep of Southdown character and good wool; Mr. Blyth taking third with a sheep of great substance.

CLASS 87—*Ram Lambs*—Mr. A. de Murrieta was again to the front, the Pagham Harbour Company taking second, and Mr. Edwin Ellis third. The lambs were not so forward in condition as we have sometimes seen them.

CLASS 88. *Shearling Ewes.*—Mr. J. Blyth won easily with a pen of choice ewes with good backs, good wool, great substance, and Southdown character; Mr. A. de Murrieta coming second, and Mr. E. Ellis third, both pens being very good.

Hampshire Downs.—CLASS 89—*Shearling Rams*—Mr. Newton's shearling placed first was of great substance, had good wool, and was of thorough Hampshire Down type. Mr. F. Moore's second-prize sheep possessed great merit; and Mr. Barton was third with a sheep of good quality, but not quite so true in character.

CLASS 90. *Ram Lambs.*—Mr. Newton was again well to the front with a very promising pair of lambs. Mr. F. Moore came second with some nice-backed lambs, but which were not quite so true in type as the first-prize pen; Mr. J. Barton being third and H.C. with useful lambs. Mr. Cole's pen were well grown but somewhat smaller.

CLASS 91. *Shearling Ewes.*—This was a small Class, Mr. Le Roy Lewis being first with a pen of great size, carrying good wool, with good backs and well matched. Mr. Newton's second-prize pen might, perhaps, have been forwarder if they had been more even.

The Shropshires were the most prominent breed at Swansea, so far as entries were concerned, their numbers reaching 81, or one-fourth of the total number of all breeds. They were judged, together with Oxford Downs, Somerset and Dorset Horns and Mountain Sheep, by Messrs. Walter Elliott and P. A. Evans, the latter of whom reported on the Shropshires as follows:—

Shropshires.—CLASS 92. *Shearling Rams.*—This Class secured the capital entry of 43 exhibits, and, taken as a whole, were a most striking display and a credit to the breeders. The first prize was won by Mr. George Lewis with a sheep of remarkably good quality both as to wool and mutton

r. Graham's second-prize sheep was of nice character, but hardly pleasing colour and rather open in fleece. Many other sheep were highly deserving prize money as evinced by the numerous High Commendations.

CLASS 93 contained a useful lot of lambs, but they did not show to advange, as Shropshire lambs are not dropped until late in the season as compared ith other breeds.

CLASS 94 contained some really beautiful pens of ewes, and the contest as close between the prize pens. The whole Class showed careful breeding nd great uniformity of character.

Mr. Elliott reported:—

Oxford Downs were fewer in number; but sheep of very good character vere shown in each Class.

Somerset and Dorset Horns.—These were a small Class, although the uality in each was very good.

Mountain Sheep.—In this Class I am of opinion that there is great room or improvement by the introduction of some of the hardier Cheviot rams from the borders.

As regards **Welsh Mountain Sheep.** From the liberal prizes given, I consider the entries ought to have been much larger, especially considering that the Show was held in the home of these sheep. Some of them were shorn on the morning of the Show, and I am of opinion that this class ought to be shown in their wool.

PIGS.

There was a strong display of pigs, mustering 113 entries, a number which, though slightly less than in the previous year, was considerably above the average.

The judges, Messrs. John Treadwell and W. J. Henman, made the following report:—

Berkshires.—The first prize Old Boar is much superior to anything else in the Berkshire Classes, although we should have preferred to have seen a little more colour in his face. The Sow Class as a whole was good. The Prize Sows were difficult to place, and several more ran up close. Some of the young Pairs of Sows were of good character, but not well matched.

Large Whites.—In the Old Boar Class we had to call in the veterinary nspector, who supported our opinion that No. 695 was deficient in his procreative powers.

The Sow Class was good, but the young Pairs of Sows did not show conspicuous merit.

Middle Whites.—This was a very unsatisfactory lot to judge, inasmuch as some of them looked as though they ought to have been in the Large Breed Class. The prizes were awarded to those we thought the most typical. No. 716 showed symptoms of rupture, consequently we passed him over.

Small Breeds.—These were a mixed lot, with a few good pigs amongst them. No. 754, we thought, looked too old for the stipulated age, in which the veterinary confirmed our opinions, and they were accordingly disqualified.

Other Breeds were represented by the Tamworth variety, of no special merit.

Cheese and Butter.

It was not to be expected that Swansea would rival Bath in the exhibition of dairy produce, but it, nevertheless, brought out a very satisfactory display of cheese and butter. It will be seen from the following figures that the butter classes were as well filled as at Newport or Exeter, while there was, in addition, a marked increase in the number of entries in the cheese classes:—

	Newport, 1888.	Exeter, 1889.	Rochester, 1890.	Bath, 1891.	Swansea, 1892.
Cheese	42	46	25	121	72
Butter	87	81	52	123	82
Cream	8	14	6	13	10
Total	137	141	83	257	164

The following report was presented by Mr. H. Underhill, one of the Judges:—

Cheese.—Class 128. *Old Cheese.*—The 15 entries in this Class ranged from good to fine; and, considering the time of year, may be regarded as satisfactory. At this season, when it is almost too late for the best old cheese, and too soon for the best new, it can hardly be expected that the cheese shown should be of the very highest quality. Nevertheless, No. 15 [Mr. J. Manfield], came very near this, and although I have frequently seen finer cheese in the autumn and winter, it would certainly have obtained a place, if not the first prize, in any competition. Of the four cheese of No. 7 [Mr. H. Cannon], three were very nearly equal to No. 15, but one was bitter, and indeed in no single entry, not even in the first prize lot, were all the four equal in quality.

Class 129. *New Cheese.*—The Society was unfortunate in not attracting any cheese in this Class above what can be called "good." Perhaps it is too early in the year—but some really fine new cheese were shown at the Royal Society's Show at Warwick, three weeks later.

There is nothing calling for special mention in Classes 130, 131, and 132.

Class 133. *Student's Cheese, Old.*—These cheese were of good quality and flavour on the whole, and would probably sell well at something under the prices for "finest" cheese. Of course I know very well that in no dairy can the cheese be all equally good, yet I think it ought to be possible to pick out four cheese, from a lot of say 30 or 40, very nearly alike. But in these "Student's Cheese," unevenness of quality in the four cheeses of each entry was the rule rather than the exception. Lot 57 [Mrs. Tilley], which I had no hesitation in saying contained the best cheese of the Class, had two very good ones, and two certainly not so good.

Class 134. *Student's New Cheese.*—While Class 128 was, on the whole, better than the corresponding Class in "Student's Cheese," I think that the New Student's Cheese was better than the new Farmer's cheese. And

none of it was really fine—the time of year, as before observed, g this—Nos. 68 [Mrs. Tilley], and 63 [Miss Davis], were quite

135. *Fresh Butter.*—If I am obliged to speak of the cheese with ; qualified praise, I can say without hesitation that many of the of butter were most excellent. It would be hard to beat No. 98 Riddle], which took the first and champion prizes. I do not know 'er saw finer butter. The flavour, quality, and texture were perfect, s "made" just as butter should be.

137. *Student's Fresh Butter.*—No. 127 [Miss C. Childs], which first prize in this Class, was an extremely good sample of butter, on comparing it with No. 98 we were unable to award it the on" prize. Many entries in this Class were also of very fine

salt butter and clotted cream, it is unnecessary to speak in detail, r three samples of clotted cream struck me as being very nice.

method of staging the butter adopted in the previous as again carried out, and met with general approval. rtainly the most attractive mode of displaying butter as yet been devised. In the cheese section there was small entry of "cream or other soft cheeses," and it be worth consideration whether the class should not led and separate prizes offered for cream cheese. The f this course at the Dairy Show would seem to show encourages exhibitors. There was an interesting col- of the local "Caerphilly" cheese, a whole milk round se about 15 to 18 inches in diameter, and 2 to 3 inches omewhat resembling in appearance the Pont du Salut f France.

POULTRY.

were 422 entries of poultry at Swansea, as compared 9 at Bath, 450 at Rochester, 463 at Exeter, and 429 at t. Owing to the illness of Mr. Tegetmeier, the whole f judging devolved on Mr. Dixon, who made the g report:—

mber of entries was a little over the usual average, and the general the exhibits much above that of previous years. In the large s **Cochins** were of unusual merit, and the **Brahmas** were very , but the entries very small. **Langshans** had good entries, and were l merit; the winners may be said to be about perfect, very bright in nd deep breasts, really grand table fowls. **Plymouth Rocks** were l, but several of the cocks were not good in colour. The **Chicken** the large varieties were fairly good, but they were mostly very d unfurnished. Among the laying or non-setting breeds, the were of much merit, more particularly the hens, and the entry was e. The **Minorcas** were a grand lot, being perfect in head points t in plumage, with good deep breasts; the entry was a good one.

The **Leghorn** and **Andalusian** classes had very small entries, and the quality was only poor. **Houdans** and **Polish** were very good in all respects, though the number might have been larger; the Polish were as perfect as any yet seen. The **Hamburgs**, as regards quality, were perhaps the most perfect Classes in the Show, nearly every pen being deserving of a prize, but we should have been pleased to have seen the entries larger. In breeds suitable for table the coloured **Dorkings** were of much merit, and mostly shown in good condition. The entry in the **Silver Variety** Class was not so large, but the quality was good, and the birds were in fine condition. The Whites were of much merit, and were shown in grand form. All the **Game** Classes were unusually good, some of the best birds that could be produced being shown in all the Classes, and in the best of condition. **Malays** were small in number, but the quality was of much merit. **Indian Game** left nothing to be desired, they were really very perfect, and in the very pink of condition. In **any other variety** the Class was a good one. In **Chickens** the Indian Game took the bulk of the prizes, and a very fine lot they were. The **Selling Classes** were well filled, and there were some wonderfully cheap birds amongst them. **Ducks, Geese,** and **Turkeys** were all fairly good, but the entries were not large. The Black or White **Bantams** had a large entry, and the general quality was all that could be wished. The Game Bantams were fairly good, and the entries about the same as in previous years.

BEES.

An interesting exhibition of the management and manipulation of bees was made in the tent of the British Bee Keepers' Association, to which the Society gave accommodation in a prominent position in the Showyard. It was under the charge of the Rev. E. Davenport, of Stourbridge, who gave lectures and demonstrations at frequent intervals, explaining and illustrating the methods of taking honey and "driving" bees.

PICTURE GALLERY.

In the Fine Art Gallery more than four hundred pictures were exhibited, and the Steward reported that the standard of the work, as compared with previous years, was fully maintained. Many of the paintings were by artists of wide reputation, and these afforded to a large number of visitors, who have not the opportunities of frequently seeing paintings of the first class, a means of studying art in its highest sense. At the same time there were exhibited works by rising artists, whom it has always been one of the Society's aims to assist.

FLANNEL AND KNITTING.

One of the chief novelties of the Show was the display o flannel and knitting, which was placed in a part of one of th Art Buildings. It was provided that the flannel in all the fou

Classes should be of South Wales make, and that both flannel and tweed should be manufactured from pure wool locally grown. There was only one exhibitor in the three Classes for flannel and tweed, but the Class for the best pair of plain hand-knitted stockings was filled by no less than 92 entries. The prizes were awarded by Lady Llewelyn and Mr. J. Colmer, and no little difficulty was experienced in making the awards in the Stocking Class. Lady Llewelyn made the following report on the Classes which came before her:—

The exhibits in all the three Classes of Flannel were surprisingly few, only one in each Class. The quality was good, but more competition would have been very desirable.

The Stocking Knitting Class was very well filled, there being 92 competitors. The knitting, as a rule, was very even and good; and though it seemed a pity that more attention had not been paid, in many cases, to the shape, yet there were many very serviceable and excellent stockings among those shown.

Messrs. Parry and Rocke had an attractive stand, not very far from the Arts Buildings, in which two or three girls attired in Welsh costume, including, of course, the far-famed sugar-loaf hat, were busily engaged during each day of the Show in knitting. At this stand, in addition to the Welsh productions, there was an old style hand-loom, with a couple of knitting machines, but the predominant feature was the decoration, which was throughout entirely of native wool.

IMPLEMENTS.

Although the collection of implements at Swansea may have been surpassed on previous occasions in actual extent, it has seldom, if ever, been excelled at the Society's Shows in representative character and comprehensiveness. There was, undoubtedly, a distinct lack of new inventions, but this must be considered nowadays as more or less inevitable. It is obvious that inventors cannot, year after year, provide new ideas, nor, after a machine has practically answered the purpose for which it is needed, is it particularly desirable that it should be constantly subject to minor changes. It is, therefore, only in a comparatively few departments of mechanical enterprise, as affecting agriculture, that one can reasonably look for any new departure, and it must be admitted that at Swansea no such new departure was noticeable.

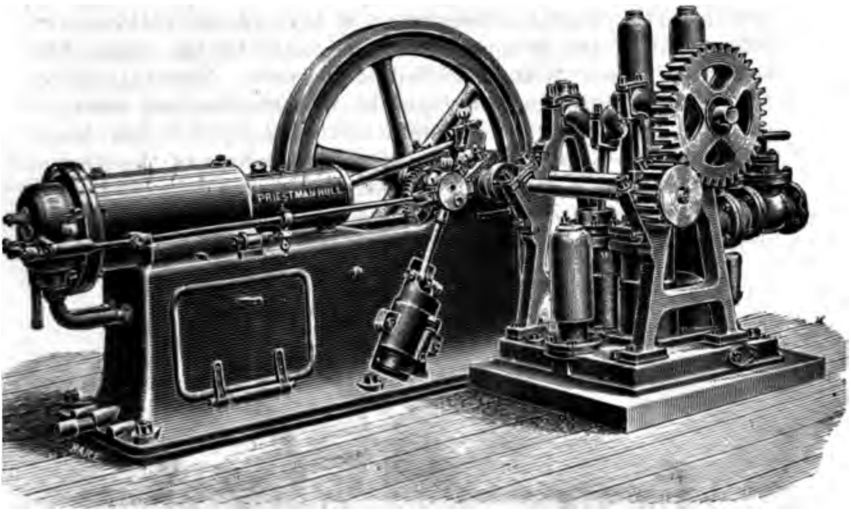
It may be said that the newest ideas were to be found in the sheds devoted to machinery in motion, and especially in those compartments thereof in which the oil-engines were collected.

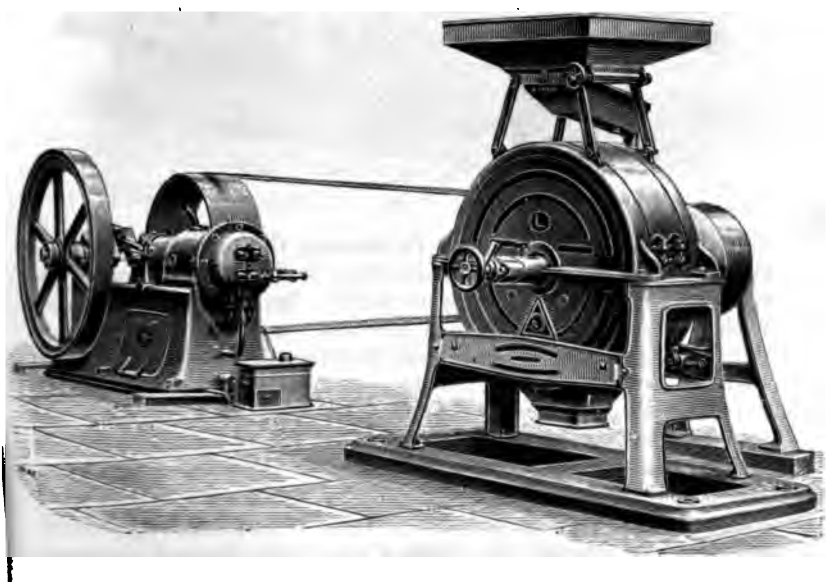
At the Bath Meeting it was noticed that gas-engines were represented with special prominence, and at Swansea a leading feature was the display of oil-engines. It is only within the last two or three years, at most, that the adaptation of petroleum for the purposes of small motors has been put to practical test, but within that period the new idea has made very rapid strides. It is evident that an oil-engine has special recommendations as a motor for agricultural purposes, inasmuch as it has all the convenience of a gas-engine without the difficulty of obtaining a supply of gas. In rural districts this difficulty is one which frequently becomes quite insuperable, and the farmer who wishes, whether for a separator, or for any other machine requiring a comparatively low motive power, to employ a small motor, had practically no choice between a steam-engine and a horse-gear. If, as now seems established, the invention and rapid development of petroleum engines answers its promise, there is no doubt that it will supply a distinct want.

On one of the stands of Mr. Charles D. Phillips was exhibited a Priestman's patent 2 horse-power horizontal oil-engine, which was noteworthy, inasmuch as Messrs. Priestman have already received two silver medals from the Royal Agricultural Society for their engines. It is stated that the cost of working these engines has been very greatly reduced, owing to the increased supplies of mineral oil and improved means of transit. Many of the engines are said now not to cost more than one halfpenny per actual horse-power of the engine per hour, and oil-engines are now being adopted in preference to gas-engines where gas is as low as 2*s.* 2*d.* per thousand feet. The accompanying illustrations show a Priestman's oil-engine coupled up direct to a set of pumps, and also driving a corn-mill. The *Times*, in commenting on the proceedings of the Institution of Civil Engineers, observes:—

"Of the more strictly technical papers, may specially be mentioned that by Professor Unwin on valuable trials he has recently made with Priestman's Petroleum Engines. If the remarkable economy shown by these trials can be carried out in ordinary working, these engines, and others of their type, should have a great future. An effective horse-power for 1 lb. of oil per hour is a remarkable achievement, and compares very favourably with the consumption of gas-engines of the most improved type. The much greater facility with which fuel can be obtained for the oil-engine makes possible a wider range of application for it. The cost of working the engine per effective horse-power is, on the above data, ½*d.*, as compared with rather over ⅗*d.* for a very good gas-engine, and rather over ¼*d.* for the most economical large condensing steam-engine."

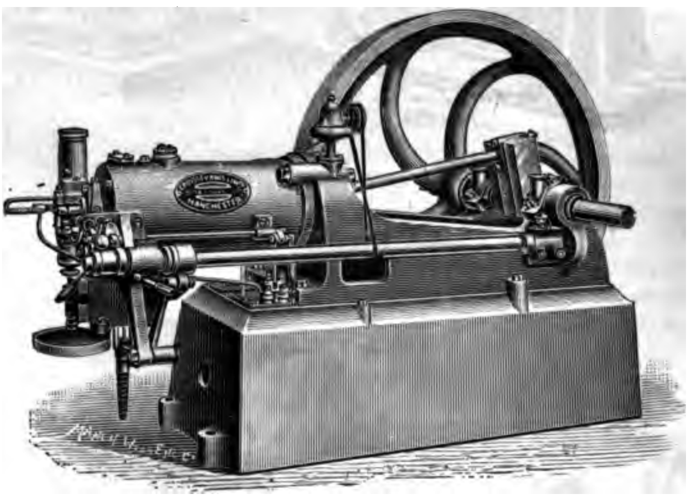
Figs. 1 and 2.—*Priestman's Oil-Engine.*





Another engine of the same type was that exhibited by Messrs. Crossley Brothers, who showed their patent oil-engine of 9 horse-power nominal, and capable of indicating 19 horse-power. The general arrangement of this engine follows very much that of the famous gas-engine made by the same firm, several of which were exhibited at Swansea. The oil, in fact, is converted into gas previous to its introduction into the cylinder. An oil tank of sufficient capacity for ten hours' running at full power, is provided in the base of the engine. From this tank a small double-barrelled pump delivers the oil, one barrel delivering to the engine's cylinder, while the other delivers to a small tank supplying the lamps for heating the

Fig. 3.—*Crossley's Petroleum Engine.*



vaporiser and ignition tube. In starting the engine, or at other times, it may be necessary to increase or diminish the supply of oil to the cylinder. In order to do this, the pumps are arranged with a tappet action, and, by inserting a washer between the pump plunger and the crosshead working the same, the desired variation in the stroke of the pump is obtained. In the vaporiser the oil follows a circuitous path, is there converted into gas and passes through an inlet valve, regulated by the governor, into the cylinder. When the inlet valve is opened the vapour is drawn into the cylinder, meeting a supply of air introduced through an automatic air valve, and a further small supply of air follows the charge of gas drawn through a passage

surrounding the case of the firing tube, and, passing through the combustion chamber, completely scavenges the passage.

Messrs. R. Hornsby & Sons, who, as usual, exhibited a large collection of their implements and machines, had a 2 horse-power "Hornsby-Akroyd" patent safety oil-engine, which is constructed to work with ordinary mineral oil, half a pound per gallon heavier than ordinary lamp oil, or with ordinary lamp or paraffine oil if desired. It is designed not only for stationary purposes, being particularly well adapted for use on a farm, but it may also be built as portable, launch, traction, tram-car or fire-engine. In short, there is hardly a conceivable situation in

Fig. 4.—*"Hornsby-Akroyd" Patent Safety Oil-Engine. Stationary Type.*

which this handy motor may not be made available. In order to start the engine a lamp is used to heat the external vaporiser, which can be readily done, in from three to five minutes, with the help of a small rotary fan supplied with the engine. On the fly-wheel being turned the engine will then start, and the lamp is extinguished, as there is no further use for it, the explosions keeping up the required heat in the vaporiser. The engine is kept running by the pump supplying a suitable quantity of oil, the supply being controlled by the action of the governor. Since its exhibition at Swansea, this arrangement has been modified, a side shaft being added, which, in addition to working the governor, actuates the air and exhaust valves

through levers and cams. The special feature claimed for this engine is its great simplicity, and one of the technical papers recently observed in reference to it, that "when one recalls how many years inventors have been at work on the petroleum engine, and what complicated devices they have produced, it is quite startling to see with what simple means the result can be attained."

Messrs. Marshall, Sons & Co. exhibited one of their new, Class M, Horizontal Steam-Engines, which have been specially

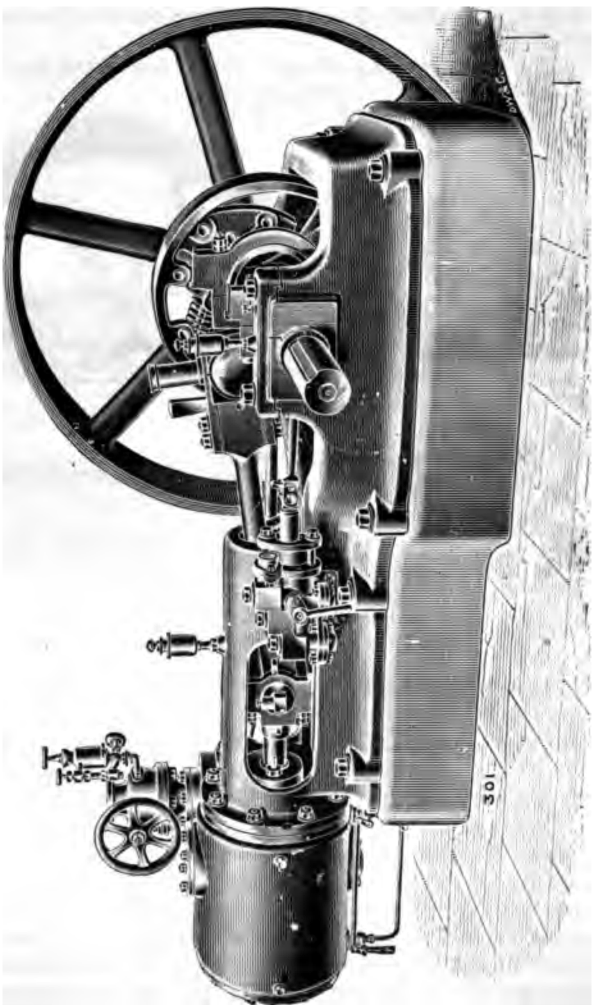


Fig 5.—Messrs. Marshall, Sons & Co.'s Steam-Engine.

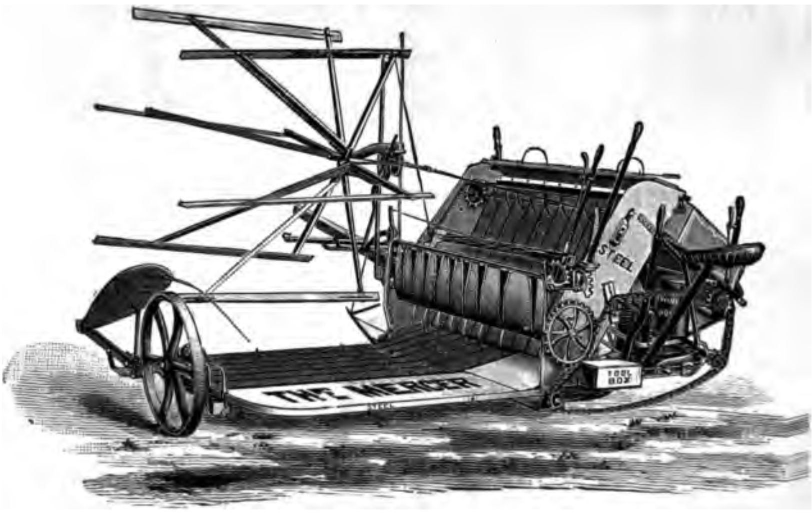
designed to utilise to the best advantage the higher pressures of steam now largely used in boilers of all kinds, and, for this purpose, are constructed throughout of ample strength to work with steam up to 100 lbs. pressure if required. The form of bed is such as to insure the maximum of rigidity in working, the trunk end of bed being bored to form sliding surfaces of large area for the cross-head, and the opposite end is specially constructed to receive the journals of the crank-shaft. The cylinder is of cold blast iron, the outer casing being well felted and covered with a steel plate. In order to promote economy in fuel, efficient feed-water heaters are supplied for heating the feed-water to a high temperature on its passage to the boiler by means of the exhaust steam. This class of engine is specially adapted for driving Electric Light Machinery, a large number being already engaged on this work, but they are also well suited for all kinds of work where a first-class engine is required which will run with the greatest economy of steam consumption.

Fig. 6.—*Dairy Supply Co.'s Farmer's "Alpha" Cream Separator.*

The Cream Separators of the Dairy Supply Company have now become a household word, but from year to year new adap-

tations of the famous "Laval" Patent are made to meet all possible requirements of the dairy farmer. Perhaps the most useful, as well as the latest of these adaptations, is that shown in the accompanying illustration, and known as the Farmer's "Alpha." This exceedingly compact and convenient machine will separate 60 gallons of milk per hour, a quantity which, only a very few years ago, was considered to be the maximum attainable even by the aid of steam. By its use the milk of from thirty to forty cows can be readily separated by one man; and, as it is commonly assumed, and indeed has been proved, that by the use of the "Separator" something like 20 per cent. more cream can be obtained, it scarcely requires argument to show that its use must very speedily pay for its initial cost. It is stated that there are now over thirty-two thousand Laval Separators in work, and that they have been awarded over 220 first prizes. No words of recommendation can add to the cogency of this fact.

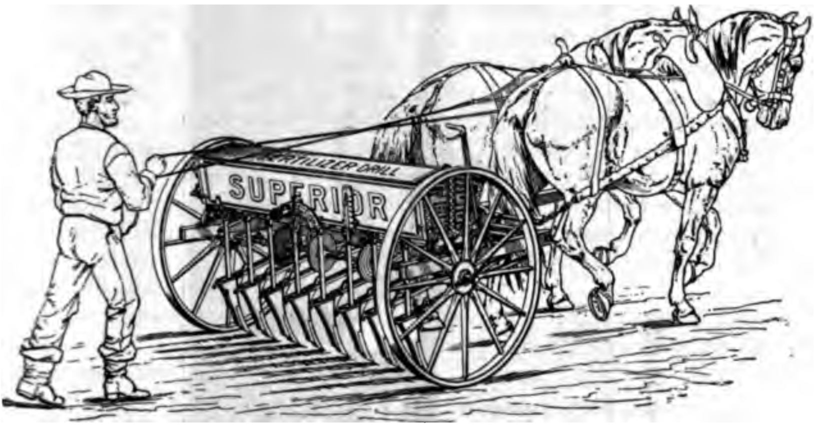
Fig. 7.—*The "Mercer" Sheaf-Binder.*



A new Canadian Sheaf-binder was exhibited by Messrs. Lloyd, Lawrence & Co. The special feature of the "Mercer" binder is that the travelling canvas apron is dispensed with, and, in its place, travelling chains, with rakes attached thereto, travel underneath the platform and up the incline. The platforms are covered with thin sheet steel through slots in which the teeth of the rakes travel. The corn is further assisted up the incline by vibrating rakes driven by chain gearing. The teeth of the

elevator rakes, after delivering the grain to the packers, withdraw from the slots and return by the action of the sprocket chains, to which they are attached, back to the conveyor tables.

Fig. 8.—*Lister's "Superior" Drill.*



Messrs. R. A. Lister & Co. exhibited on their stand one of their "Superior" Corn, Seed, and Manure Drills, which will sow artificial manures without mixing with ashes or other absorbents, and also dispenses with the necessity of using water. It is supplied with a new double distributor, and the seeding of grain and small seed is regulated and controlled by means of sliding pinion and disc wheels. This absolutely force feed delivers the grain in a uniform unbroken stream, always in the desired quantity, and through all the distributors equally. The axle revolves, each of the wheels being independent, so that the seeding is kept up evenly when turning corners. The grain, small seed, and manure disc wheels are all on the axle near the centre of the drill under the hopper, so that a change in the quantity of grain or manure may be obtained at any moment without change of parts or wheels. The disc wheel manure attachment permits the sowing or non-sowing of manure in fields of varying fertility, the feed being accomplished by dropping or raising a lever, and without stopping the horses. It is claimed that a great economy of manure is secured by using this drill; the substance lies quietly on a revolving plate, and is not stirred or worked except at the instant of discharge when it is dropped out in the exact quantity the drill is set to sow.

A new patent One-wheel Double Hurdle was exhibited by Mr. George Coombe, which was claimed to be a great time-saver in folding sheep. The accompanying illustration is prac-

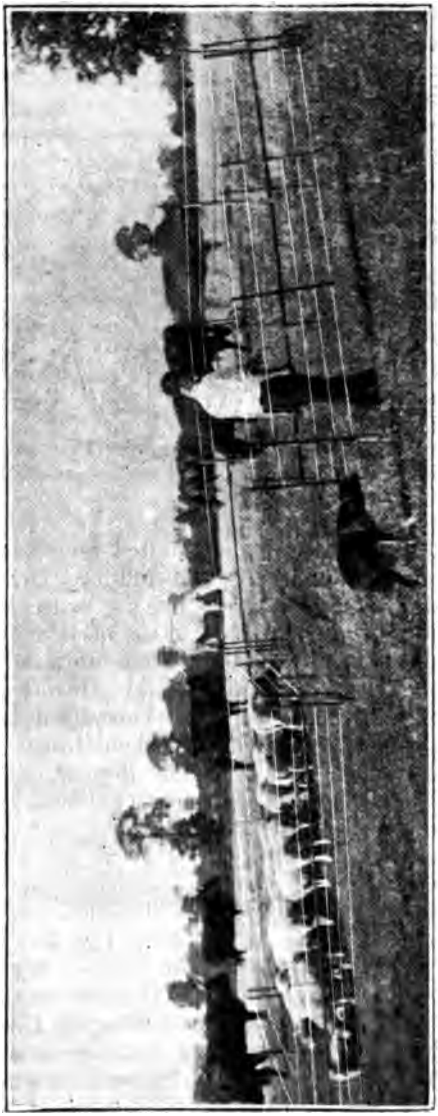
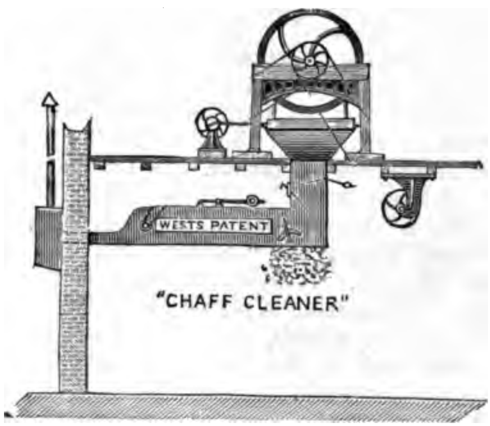


Fig. 9.—*Coombe's Patent Hurdle.*

tically self-explanatory. The hurdle can be moved and fixed as easily and quickly as an ordinary iron hurdle, while one wil

; much ground as five, so that there is obviously a great
y of time. By placing them in a slightly zig-zag posi-
ıd firmly linking them together, the hurdles do not
to be let into the ground, thus further saving time and
oiding the wear and tear of ordinary hurdles. These
, though exhibited for the first time in public at Swansea,
id to have been thoroughly tested during two seasons
large flock, and found to be practical and serviceable.
addition of an extra wire, the sheep hurdle can be
l for dividing grass land for any kind of stock.
rs. Lemon & Sons, of Cardiff, exhibited their new patent
utters, the special feature of which is that they cannot
r be choked or the feeder's hand drawn into the rollers,
ersing spindle being so placed that if both hands were
in the rollers, the feeder's arms by pressing against the
rould instantly reverse the machine and release his
efore they could reach the knives.
'rames of these machines are made of well-seasoned hard
nd best wrought iron, and they are specially simple in
ɔtion.

Fig. 10.—*West's Chaff Cleaner.*



's. West & Co. exhibited several of their Chaff and
leaners and Separators, which are constructed and made
for field purposes, stackyard work, &c., and combined
haff-cutter, will cut, separate, clean, and extract the dust,
nd every obnoxious matter from the chaff, and bag off
peration. The desirableness of using some means of
chaff from its impurities before it is given to horses or
now generally acknowledged. Messrs. West exhibited

several terrible warnings in the shape of agglomerations of chaff dust taken from the intestines of horses, and it was stated that one of these formidable-looking dust balls actually weighed as much as 17½ lbs. This chaff-cleaning apparatus is adaptable either to hand or power chaff-cutters, and will not only treat chaff but is applicable also to the dressing of wheat, oats, barley, beans or seeds.

The high price of hay during the last season naturally directed the attention of those fortunate farmers who possessed a good supply and were able to dispose of it, to the question of reducing its bulk for carriage by rail. One of the best known hay presses was exhibited at Swansea by Mr. J. Bradbury. This machine is constructed on the ratchet and lever principle, and is very simply and easily worked. Being mounted on wheels it is readily portable, and can thus be quickly moved from one stack to another. In these days, when the saving of railway carriage is of such material importance, the attention of all farmers who may be able to find in the towns a market for hay, should be directed to the advantages of a baling press, which will reduce the bulk of the truss by about 50 per cent. as well as considerably economize the labour of handling.

Messrs. Harrison, McGregor & Co. had as usual a large number of their celebrated "Albion" Mowers and Reapers, forming one of the most extensive collections of harvesting machinery in the yard. Distinct improvements, especially in the direction of lightness and simplicity combined with strength, were noticeable in several of the "Albion" machines which, year by year, find increasing favour. In 1891, at an important field contest of Mowing Machines held by the French Government, the "Albion" Mowers gained the first prize. As a combined Mower and Reaper, the "Albion," No. 5, enclosed centre gear, is most efficient. It is constructed chiefly of malleable iron and steel. The gearing is placed in the centre of the frame between high driving wheels, and the driver's seat being supported from the back of the frame, the whole mechanism is perfectly balanced for work.

Messrs. Woodroffe & Co., on their large stand, had a number of their "National" Mowers, Reapers, and Horse Rakes. In the "National" Mower, an improvement, introduced in the season of 1891, in the tipping lever enables the points of the finger bar to rise first. The "National" Horse Rake is a very simple arrangement for adjusting the teeth, is extremely light in delivery, and has self-locking leverage.

Messrs. J. & F. Howard, in addition to a good collection of their well-known specialities, had a new "Kicker-Tedder," which has all the latest improvements of this now favourite

ass of machine. It is especially light in draught, and the eculiar action of the spring forks enables the machine to ft the crop from the ground and scatter it in a most effective ıanner.

Messrs. Ransome, Sims & Jefferies, on their two stands, had large display of their famous engines and implements. In ıe machinery in motion section they had a 6 horse-power ortable steam-engine fitted with all their latest improvements, nd working one of their well-known Finishing Threshing Iachines. They also exhibited a number of their famous loughs, haymakers, horse-rakes, and lawn-mowers, and (to be ı the fashion) a new "Ipswich Hay-kicker" of their own pecial design.

THE WORKING DAIRY.

The building at Swansea in which the Dairying operations, which have now become so essential a feature of the Society's shows, were carried on, was constructed after the design which has ıow become familiar. Generally speaking, its dimensions and ırrangement were similar to those of the corresponding structure ıt Bath, but one or two additions had been made to the offices ınd accommodation for the working staff, and for the large number of persons taking part in the various competitions throughout the week. As on previous occasions, the operations at the Dairy were the centre of attraction at almost all times during the Show to a large crowd, and the considerable amount received for admission into the reserved seats testified to the keen interest taken in the proceedings. Those who were chiefly interested in the agricultural progress of the locality were especially anxious that the attention of local visitors should be directed to this department of the Society's work, and there was every indication that the farmers of the district realised the advantage of the teaching by precept and example which was brought to their doors.

The Staff engaged at the Dairy was augmented, as, instead of two teachers and demonstrators as heretofore, no less than six were engaged; namely, Miss Angus, Miss A. Benjafield, Miss M. Benjafield, Miss M. Davey, Miss M. Smart, and Miss Williams. The Society was again fortunate in securing the services of Professor Carroll as a demonstrator, and throughout the Show his practical teaching and explanations were listened to with the utmost attention, and also, it may safely be assumed, with considerable profit to his listeners. On each of the first four days a lecture was delivered. On the first

day Professor Long spoke up on 'Foreign versus English Butter,' and on the second day he had for his subject, 'Private Dairies or Factories; which will best answer the purpose of the Dairy Farmer?' On the Friday Mr. F. J. Lloyd lectured on 'The most Economical System of Feeding a Dairy Herd,' and on Saturday Professor Carroll summed up and epitomized his daily demonstrations in a lecture on 'Improvements in Butter-making.' The control and practical management of the Dairy was, as before, in the well-tried hands of Mr. George Gibbons.

In recent years it has been the practice of the Society to offer prizes for dairy appliances, and the competition for these prizes has often formed one of the most important and interesting features in connection with the Dairy. At Swansea a gold medal was offered for the best milking-machine, the following to be regarded as essential points in making the award—efficiency, simplicity in working, and economy in cost. Unfortunately, however, no inventor came forward to compete for the prize.

The greater part of the equipment of the Dairy consisted of the battalions of churns and butter-workers, supplied by Messrs. Bradford, Hathaway, Llewellin, and the Dairy Supply Company, and which were used in the different butter-making competitions throughout the week. Indeed, these competitions have now grown to such a magnitude that they practically monopolise the greater part of the space of the building. There was, however, a sufficient representation of improved appliances for Dairy work. The Dairy Supply Company sent four separators of various sizes. The largest, driven by steam power, and known as the "Leviathan," was capable of separating 350 gallons per hour. This, like all the new Laval separators of this firm, was fitted with the rings distinctively known as the "Alpha" patent, which have the effect of practically doubling the capacity of the machine. The other three separators were all within the compass of hand-power, and one of them, the "Farmer's Alpha," is referred to previously in these pages. The Dairy Supply Company also furnished for use in the Dairy a large size patent Capillary Refrigerator. Messrs. Freeth and Pocock sent one of their hand-power "Victoria" Cream Separators, capable of separating 20 gallons per hour.

At one end of the dairy there was, as usual, a complete equipment for the demonstration of the process of making Devonshire or clotted cream. Each day throughout the Show this process was exhibited. It need hardly be added that the

ras the usual complete collection of various utensils and ppliances for effective dairy work.

The Butter-making Competitions, as usual, excited much nterest, and attracted more competitors than on any previous occasion, the total number of entries being 175.

Four competitions for butter workers were arranged for the irst four days of the Show, and, on the last day, a Championship Competition and a Consolation Competition were added. None of the competitions were open to makers or vendors of churns or heir assistants. In the class arranged for the first day of the Show, four prizes were offered for the best and largest quantity of butter made from a given quantity of cream, in the cleanest and most approved style, by students who had attended a course of instruction at any of the Society's Butter Schools, and 42 competitors entered. The following were the chief awards, in addition to 18 commendations. The weight of butter made in each case is given, but it should be borne in mind, in regard, not only to this but to all the competitions, that the Judges, in making their awards, took into consideration many other points besides the actual weight of butter produced, as, for instance, its condition at the end of churning, its condition when placed on the butter worker, its appearance, texture, colour, flavour, and moisture. The quantity of cream given to each competitor in this Class was 7 lbs. 9 oz.

Award.	Competitor.	Weight of Butter. lbs.	oz.
1st.	Miss R. Charles	2	12
2nd.	Miss S. A. H. Digwood	2	13
3rd.	Miss A. A. Walker	2	14½
4th.	Miss M. Lewis	2	12
R. & H.C.	Miss A. M. Stratton	2	13
H. C.	Miss A. M. Evans	2	11
H. C.	Miss M. Howells	2	11
H. C.	Miss A. Methies	2	12
H. C.	Miss N. Stokes	2	10
H. C.	Mrs. M. Yeates	2	13
H. C.	Miss I. Allan	2	8
H. C.	Miss Ashman	2	12½
	Average	2	11¾

On the second day prizes were offered on similar conditions, but the competition was confined to women, though without any restriction in regard to attendance at one of the Society's Schools. The amount of cream allotted to each competitor in this Class was 6 lbs. 8 oz., and the following were the chief awards, in addition to 12 commendations:—

Award.	Competitor.	Weight o Butter. lbs.	oz.
1st.	Miss I. Allan	3	0
2nd.	Miss A. A Walker	2	15
3rd.	Miss N. Stokes	2	14
4th.	Miss A. M. Stratton	2	15
R. & H. C.	Mrs. R. E. Gordon	2	14
	Miss S. A. H. Digwood	2	14
	Miss A. M. Evans	3	1
H. C.	Mrs. M. Yeates	3	0
	Mrs. M. J. Williams	2	14
	Miss M. Howells	2	14
	Miss Watts	3	0
	Average	2	15

On the third day of the Show the competition was open any man or woman, except the winner of the first prize on previous day. The quantity of cream was 7½ lbs. to e competitor, and the chief awards were as follows, 11 comm dations being added:—

Award.	Competitor.	Weight o Butter. lbs.	oz.
1st.	Mrs. M. J. Williams	3	0
2nd.	Miss Jenkins	3	4
3rd.	Miss A. A. Walker	3	1
4th.	Miss S. A. H. Digwood	3	2
4th.	Miss E. Jones	3	2
R. & H. C.	Miss E. Phillips	3	1
	Mrs. M. A. Cambidge	3	1
	Miss F. M. Cole	3	2
	Miss A. M. Evans	3	1
	N. Minifie	3	1
	Miss N. Stokes	3	0
	A. Worman	2	13
	Mrs. M. Yeates	3	0
	Mrs. R. E. Gordon	3	1
	Miss S. J. Owen	3	1
	Miss L. Steele	3	1
H. C.	Miss M. E. Kirby	3	1
	Miss Kate Stallard	3	0
	Miss Ashman	3	1
	Miss R. Davies	3	2
	Miss M. Howells	2	15
	Miss M. Lewis	3	0
	Miss A. Methies	2	15
	Miss M. Walters	3	1
	Miss Watts	2	15
	Miss P. Mainwaring	3	1
	Miss C. Mordecai	2	15
	Miss G. Jenkins	3	1
	Average	3	1

ı the fourth day of the Show, the competition was open to man or woman, except the winners of the first prizes on the previous days. The quantity of cream allotted to each ɔetitor was 5½ lbs., and the Judges made the following ·ds, in addition to 19 commendations :—

Award.	Competitor.	Weight of Butter. lbs.	oz.
1st.	Miss Watts	2	6½
2nd.	Mrs. M. Yeates	2	8¼
3rd.	Miss M. Lewis	2	7¼
4th.	Miss A. A. Walker	2	6¼
& V. H. C.	Miss Jenkins	2	7
H. C.	Miss J. Burrough	2	6½
	Miss F. M. Cole	2	6¼
	Miss S. A. H. Digwood	2	5¾
	Miss A. M. Evans	2	7¾
	Miss E. Moss	2	5¼
	Miss A. M. Stratton	2	8¼
	Miss E. M. Bevan	2	6½
	Mrs. R. E. Gordon	2	5¼
	Miss L. Steele	2	6¼
	Miss Ashman	2	6¾
	Miss M. Howells	2	5¼
	Miss E. Jones	2	6½
	Miss M. Walters	2	6¾
	G. P. Jenkins	2	6
	C. J. Renouf	2	6½
	Average	2	6½

)n the last day of the Show, Gold, Silver, and Bronze Medals, each case accompanied by the Society's certificate, were red for the competition of winners in the classes held during previous days. There were twelve competitors, and 6½ lbs. cream were allotted to each of them. The following were results :—

Award.	Competitor.	Weight of Butter. lbs.	oz.
›ld Medal.	Mrs. Williams	2	6¾
lver Medal.	Miss Walker	2	5
›onze Medal.	Miss Digwood	2	6¼
& V. H. C.	Miss Watts	2	8
V. H. C.	Miss Allan	2	6
	Miss Charles	2	5½
	Miss Jenkins	2	6
	Miss E. Jones	2	6¼
	Miss M. Lewis	2	6¾
	Miss A. M. Stratton	2	6¼
	Miss N. Stokes	2	3¾
	Mrs. Yeates	2	7½
	Average	2	6

An extra prize of a Silver Cup, value ten guineas, was added by the President of the Society for the winner of the Gold Medal.

In announcing the results of the Championship Competition, the Steward (Mr. Gibbons) said that on each day throughout the Show there had been improvement noticeable, especially among those young girls who had only attended the schools and engaged in butter-making ten days before the Show.

On the same day, a Consolation Class was arranged for those who had not won prizes on previous days, the Swansea Local Committee placing a sum of 6*l.* at the disposal of the Judges for this purpose.

SUNDAY SERVICE.

The service on the Sunday of the Show week was held in the Dairy, the sermon being preached by the Rev. Canon Smith, Vicar of Swansea. The band of the Royal Marine Light Infantry assisted in the musical portion of the service. There was a very large congregation, which included, in addition to the herdsmen in charge of the stock and others engaged in the yard, many of the Stewards and other officials of the Society.

Original Articles.

ꞔc Breeding of Draught Horses. By WILLIAM GRAHAM, of Eden Grove, Penrith.

INTRODUCTORY.

›nse to a request to contribute an article on the above to the Journal of the Bath and West and Southern ı Society, it will be my endeavour, while not professing ıny information that is of a new or controversial cha- › give, from practical experience, a breeder's ideas, as to , breeding, and management, of this important branch gricultural interest. Much of this information may be well known and acted upon by those who breed draught

confine the consideration of this subject to the best ypes of draught horses of Great Britain only; and will ıss the merits and characteristics of any foreign breed. ɜnt purposes there may be mentioned what are now three breeds or classes of draught horses, namely, the Clydes- Shire, and the Suffolk. Besides these, there is another purely agricultural draught horse found in Northumber- l the immediate borders of Scotland, called the Vardy ›ut this last-named description is becoming rapidly into the ranks of one or other of the two predo- ; types of draught horse, namely the Clydesdale and ›. These, for the practical purposes of this article, will e the term "draught horse." At the same time, due ›dgment may be made of the usefulness in their own ›f that most distinctive type of draught horse, namely, ›lk Punch, which, when the character of the soil and ıre considered, is no doubt, in the eastern counties of more thoroughly adapted to the requirements of the ral community than either of the other varieties of the horse.

PRINCIPLES OF BREEDING.

'aught horse is required principally for two purposes, Hauling the heavier traffic in town and country; and orking and cultivation of the land. It is, therefore, with

regard to these two purposes that suitable stock has to be bred. The lighter type of draught horse finds a ready market for that class of town traffic connected with quick delivery vans and carts; and, although this is not a branch of draught horse breeding generally aimed at or very remunerative, it, nevertheless, affords a market for those of the breed which are not quite up to the standard of power required for the heavier traffic of the streets and the service of farms.

The principle to be kept in view in breeding draught horses is to select and use stallions and mares that, from their personal character and known breeding, are likely to produce horses combining power with activity, of such proper structural development that, in the performance of their work, they shall not unduly strain, wear, or prematurely destroy any one limb, member, muscle, or sinew. Otherwise an animal that, with proper treatment, ought to be useful and last for some considerable time, may be rendered useless or less valuable at an early period of its age.

THE DRAUGHT STALLION.

Whether the male or female parent has the more potent influence over the character of the offspring is a subject on which opinions differ considerably. In the animal world, generally speaking, the male exerts a strong and predominating influence, particularly over the anatomical formation and development of the limbs of the produce: also over the colour and character of the hair with which the body is clothed, and the temperament of the animal. Therefore, in selecting the stallion, avoid horses that are in any way defective in the relative position and character of any one section, limb, or joint of their fore and hind legs. This ought to be much more studied, when stallions are selected for use on mares, than great bulk of carcase and exaggerated action in trotting-movements. This latter point many stallion owners seem to cultivate in showing off their animals because the public take a delight in witnessing it. Many big-bodied stallions, with badly-formed knees and hocks, round fetlock joints, short and straight pasterns, and small, weak, and contracted heels, can do a short trot or walk in the best of style; yet, when the relative position and character of these respective members are examined, they are found utterly worthless for use and in the stud. Too much importance cannot be attached to the structural development of the legs and feet of any stallion, whatever else the animal may have to recommend him in respect of size, weight of body, or pedigree. The want of proportionate and proper anatomical structure in these parts means nothing more nor less than absence of the lasting and

wearing utility of the animal for the purposes for which it is required to be produced, and it also indicates deficiency of power. An animal may possess what is in some quarters so much talked of, namely, weight of carcase, but if the bones of the legs are not of the hardest character and the limbs placed in proportionate position, great weight of carcase only renders the bones more sensitive to the wear of concussion, and the joints less able to respond with ease and activity to the movement caused by the extension or contraction of the muscles of the various limbs when in action.

The produce of any animal in respect to its size also generally follows the sire rather than the dam: therefore, in breeding horses for haulage and draught purposes, size is a great consideration, and, in this particular, too great height ought to be particularly avoided, as it is generally a consequence of disproportionate height of limb, or some other such malformation. About seventeen hands is the outside height a stallion should stand, as a properly developed horse of this height can, and does, reproduce colts that, when gelded, are of great power and substance; in fact, of quite sufficient size to haul the heaviest weights without any sacrifice of speed. This must be considered a main feature; as the greater the speed a draught horse can walk at, or a van horse trot at, with a maximum weight, the greater its proportionate value. Horses of excessive size also take a larger proportion of food to sustain their power up to its maximum; and, as the cost of keep is an important item in the economic value of any animal, it surely must be more useful and economical to employ, say, a pair of single horses that would haul a certain weight at two journeys, rather than three heavier horses capable of hauling the same weight at one journey, even if they took rather less time over the work than the two lighter-bodied horses, although in other points equally good.

As tenant farmers breed the bulk of the draught horses of the country, their interests in this important subject must not be overlooked. For all practical purposes connected with agricultural employment of the draught horse, animals of excessive size and weight are neither desirable nor profitable. They are not only more clumsy at their work on the land, but they do not come to maturity, in the sense of being seasoned for work, at such an early age as the gelding or mare of more moderate size. It cannot be disputed that the big and heavy horses, that it is the fashion to breed in some parts of England, have neither the activity of those of a rather more moderate size, nor the better quality of bone, more wearing character of limbs and joints, and greater speed of action which are generally combined therewith.

Another point which bears upon the external appearance of a stallion wants to be carefully borne in mind, namely, not to use a horse that has any superabundance of loose, curly, hard hair about his legs and feet. This is a sure indication of a constitutional tendency to what is known as grease and kindred ailments, beside being quite out of place when the character of the work a draught horse is called upon to perform is considered. When the excessive growth of hair about the legs has been encouraged by means of blistering the various parts, such as coronets and back sinews, it is very often due to nothing less than pure deception, and is only meant to hide some deficient structural development of hoof or pastern; or else to add to the supposed measurement of so-called bone below the knee when either handled or measured.

While on the subject of bone measurement, either of fore or hind legs, it is as well to observe that no bone is properly measured and properly recorded when the part taped includes all the superficial hair that grows on horses' legs, especially in the case of the rougher class of stallions. In measuring horse bones the hair ought to be raised and the tape or string stretched round the pure skin and bone.

In reference to the colour of a stallion, great patches of white on the body, or a blaze of white on the face, should be avoided if possible; but, if the animal is otherwise of a good sound colour with moderate white markings on his fetlocks or legs and face, there can be no objection on this point, although the foreign market generally favours horses of as near a whole colour as possible, with little or no white. Of late years some horses have been exhibited perfectly disfigured through their gaudy appearance, and, singular to say, they are generally of a coarse structural character also. Great dissatisfaction has been expressed at the prominent place this class of horse has been given in the Showyard.

To exemplify the class of living horse it is desirable to breed from, we may take among the Clydesdales such horses as the best sons and grandsons of Darnley (222), and of Prince of Wales (673), in particular; amongst the Shires such horses as Vulcan, R.R., Royal Sandy, Calwich Combination — perhaps the finest Shire stallion of the present day—and Willington Boy. The latter, by the way, has a strong infusion of Clydesdale blood in his veins, being twice descended from the Scotch-bred horse Young Lofty (987), that was some years ago taken down to Gloucestershire, and, after being used there successfully on the local mares, was bought and re-sold to a stallion owner in the neighbourhood of Burton, adjoining Derbyshire, where he was said to be used extensively on the local-bred mares.

Willington Boy, as regards his breeding, holds relatively the same position to the Shire breed in connecting it with the Clydesdale blood, as Prince of Wales (673) is said to hold to the Clydesdale; although Willington Boy's breeding shows authenticated Clydesdale blood more strongly concentrated than the breeding of Prince of Wales does that of any Shire blood. As the horses named are of public reputation, they may be referred to, in exemplifying the type of sire that it is desirable to breed from, without making any invidious comparisons. Now when a horse, such as Willington Boy, having a strong infusion of Clydesdale blood in his breeding, is so prominently brought before the public as a prize taker and sire, the question arises whether or not the general breeder—that is the tenant farmer—of the ordinary dray or agricultural horse or mare should strictly adhere to the defined lines of pedigree Shire or other breed stallions? Or should he, on his ordinary heavy work mares, use horses irrespective of whether they are of distinct Shire or Clydesdale blood, so long as the stallions are of that defined type already mentioned, especially when one considers the good results obtained by the breeders of what are supposed to be pure bred mares who use as stallions horses with an acknowledged mixture of alien blood in their veins? The answer to this query is obvious. It is, that if the farmer or breeder has what are termed Stud Book mares of either the Clydesdale or Shire breed, likely to produce stock that will be suitable and profitable to rear as stallions or pedigree mares, he should stick to the line of breeding of the same character as the mare. If, on the other hand, his mares are not suitable for this purpose, or, if he does not intend to incur the expense and risk which breeding the highest class of stock involves, the wiser course is to select a stallion of the best quality, moderate size, good action and sound, whether it be Clydesdale or Shire. But above all things he should avoid the use of a stallion with a big heavy body (out of proportion to his limbs), and thick round joints and legs covered with an unnatural development of coarse hair, as this class is a most uncertain breeder, generally throwing stock not only of a common description, but with a liability to such hereditary unsoundness as bad hoof formation, side-bones, ring-bones, and spavined hocks.

THE DRAUGHT MARE.

Having discussed in detail the draught stallion, we will turn to the consideration of the draught mare, and, in doing so, note the characteristics most readily transmitted through the female to her progeny. Two points stand out clearly, namely, the shape of body—that is, carcase as differing from limbs—and

speed, or energetic activity of movement, in other words, the nervous system; though no doubt the female exercises a modifying influence over other characteristic propensities of the male. To exemplify this, let anyone who has used a thoroughbred—that is, blood-stallion—on a cart mare think of the result for himself, and he will observe the various indications of influence of both male and female parent already pointed out. In appearance and character the progeny largely resembles the sire in head, shoulder, and limb; hair also is less abundant on the leg than on that of the cart-bred dam, but in carcase and hind quarters the heavier development of the female parent is present. Nor can speed be sustained or developed to anything like the degree possessed by the male parent in such crosses, and, in this respect, the progeny takes after the dam. This same rule will therefore hold good in breeding pure draught horses. Consequently, in selecting stock mares for combination of work and breeding purposes, while by no means neglecting strength of bone, be very particular to get mares of the greatest activity in movement, that, in walking or trotting, take a good full step, and freely bend the feet from the fetlock and pastern joint, having, rather than high knee action, good free movement from the shoulder, as on this greatly depends the length of stride each movement covers, and so the time taken in travelling any given distance. As regards the shape and size of body, so long as the mare has well sprung fore ribs, leaving plenty of space for the play and action of heart and lungs, a broad chest, with a full, well developed hind quarter, the rest of her body structure will fill up with maturity, unless there is some radical defect; in fact, the tendency of mares, if properly fed and attended to, is to develop with age too large a carcase rather than to look wasted and small, especially mares that are in a regular breeding state and condition. With regard to colour and markings, these are not of so much importance in the mare as in the stallion, who most decidedly exerts a much stronger influence over the offspring in these particular points. But, on the other hand, it is very important to use a stallion from a good sound-coloured mare, as then his influence will be all the greater in this particular.

INFLUENCE OF SOIL AND CLIMATE.

I have briefly indicated the lines that it is advisable to follow in selecting and mating the stud mares and stallions, but there are other points that are worth taking into consideration; such is the influence which soil and climate exert on the physical development and maturity of horses, as well as on that of stock in

general. There can be no doubt that this influence is very potent, and that so-called weight or size of bone is particularly dependent on such circumstances as the nature of the produce and character of the land on which horses are raised. For instance, bring the best class of Clydesdale mares down from Scotland to the rich grass lands of Northamptonshire, or the fens of Cambridgeshire, and the offspring will show a marked difference in character from the original stock, developing a greater size of bone and carcase, although not possessing any material increase of strength over their parents. An instance of this was very clearly indicated in the Whittlebury stud of Clydesdales, which were so successfully bred by the late Sir Robert Loder, and shown by him at all the leading shows of the midland counties, until the fashion was adopted of confining the draught horse section of these shows to what may be called Stud Book bred Shires. The success attending the Clydesdale studs of Lords A. and L. Cecil in Kent, and Sir J. Duke in Sussex, at the south of England Shows, where, in mixed classes, Clydesdales and Shires still compete together, also indicates that, when draught horses are reared under similar local conditions of soil and climate, the very marked distinctive difference that is observed between a certain section of Shire bred animals and those of a cleaner make and build is lost to a great degree, especially when the animals come to four or five years of age. Thus, provided the stallion approaches the medium height of between 16·2 to 17 hands, is about 11 inches in clean measurement below the knee, with hind leg measurement of 12 inches or so to correspond below the hock, possesses good muscular development of thigh and fore arm, with well-shaped and sound feet and sufficient slope of pasterns, we have an animal suited to breed the most wearing and useful class of draught horse, either for dray or agricultural purposes, and the males of which, when gelded, will develop quite a sufficient weight of carcase. Weight of carcase is supposed to add to the animal's power in the dray, but, if it be too great, it tends not only to encumber its speed but also to render the gelding less useful by depreciating its wearing and lasting character, and also to make its maintenance more expensive in proportion to the work it can perform.

DRAY AND AGRICULTURAL HORSES.

The breeding of geldings and mares for heavy town and dray work is only one section of the subject that has to be looked to by the farmer and breeder, and it is perhaps not as important to him as the question of keeping up his stock of mares for carrying on, economically and with activity, the various occupations con-

nected with agricultural cultivation. For this purpose horses of excessive size and weight are of very little practical good, besides being, as previously stated, much more liable to the various forms of unsoundness, that, at any cost, ought to be guarded against in breeding horses. As we find that hunters, and the class included in the term thoroughbred horses, are much less liable to side-bones and kindred diseases of the pedal bones than cart horses, therefore the same theory will hold good with them as with the different classes of draught horse. This can only be owing to a difference in bone formation, which will also be directly connected with the general physical nature of the body. These facts again point to the conclusion that, in selecting breeding stock, largeness of size in the animal, especially in bone formation, is not a requisite condition provided a specific standard is reached, and that it is of the right quality. While comparing the characteristics of the different classes of horses, it may be as well to remark that draught horses are less liable to diseases and malformation of the hock bone than the thoroughbred or clean-legged class of horse; but they are perhaps more liable to disease—*i.e.*, bad formation and lameness in the stiffle region—than the thoroughbred or clean-legged horse; the term clean-legged horse being here used as a distinction between the thoroughbred and the draught horse proper.

FOREIGN MARKETS.

In some quarters it is becoming general to affect indifference to the foreign markets as an outlet for surplus draught horse stock, there being at present a falling off in the number of horses exported. But the indications of the lines on which draught or cart horses should be bred suitable for this important market, as shown by the reports of exportations in the leading agricultural journals of the day, point to a leaning, both by the American and Continental buyer, to what is termed the Clydesdale type of draught horse rather than to the Shire type and this after considerable experience of both breeds, especially by the American importer. Although the export trade in draught horses between Great Britain and the United States may not again assume the dimensions of former years, yet in the near future a considerable increase in the demand for the better class of breeding stocks generally, and horses in particular, may be confidently expected and provided for. Experience of the past clearly shows that it is to the studs, herds, and flocks of Great Britain that the foreigner has to turn for special breeding stock for stud purposes, not only with the view of creating fresh stock,

lso of maintaining the hardy character and distinctive 'aluable features of the home-bred farm animals of all ns.

FOALING.

ere are certain other points in the management of draught s that come under the heading of this article. In the first , there is no advantage gained ultimately in having foals ng too early in the year, in fact there can be little doubt it is bad economy. Mortality is much more frequent g early born foals than among those foaled from towards nd of April to the end of June, owing to the richer and less tible character of the mare's milk when she is in any way fed, and cannot at the same time get a fair bite of young , and exercise. This no doubt both cools and purifies the , and is requisite, especially if the mares have been on ing keep during the winter and spring months, and there reason why the mares should not be worked up to the of foaling if carefully managed and attended to. Then , the mares settle to their service much more readily if erved until they get grass than if put to the stallion, as ual, at the ninth or tenth day after foaling, when they are tificial keep, as they naturally would be up to the end of . This also accounts for so many mares missing breeding easons in succession, for, if they return once or twice after e—which, under these circumstances, they very generally ien under hard keep—there is a greater difficulty in getting in foal that season, and the stallion is frequently blamed the real cause lies with the mare, or her management ous to being sent to the horse.

great many young foals are lost early in the year owing to catching cold, which they readily do within the first month. y get over this age many fall victims to joint felon in connce of being turned out before the season has sufficiently ced. The land is then cold and wet, wanting the natural th and dryness that is usual after May comes in, and the when they lie down, feel the change from the dry bed of m box. The cold and often wet land strikes their system t immediately; and when this occurs fatal results or rheufelon almost always follow. All these evil consequences ther easily avoided or greatly reduced by not having the foal too early. It is surely much better economy and gement to risk a mare or so not holding to her service, h inexperienced people generally are frightened of, when the are not put to the horse early in the season) than to get mares in foal early, and most probably lose quite half or

more of the produce, as is often the case when the mares foal early in the year. Also, by the time a colt or filly is over two years old, all advantage the early foal has over the later foal is lost, for the former is ready to break in no sooner than the latter. Besides, the risk of loss being less in the later born foal, the period of rest breeders generally contrive to give a mare that has been regularly worked up to foaling must be much more beneficial to her if spent out at grass than if spent standing in a box and being hand fed the same as during winter and spring.

WEANING.

The best period to wean the foals is either during September or early in October. They should be put on good grass and supplied with a hand feed of crushed oats and bran mixed with some chopped hay or straw chaff, either once or twice a day, according to the state of the pasture they are put into. Continue this feed until the foals are quite a year old. During the depth of winter add some boiled corn and sliced swedes to the other feed, and continue this until the grass begins to shoot again. Foals if well looked after the first year of their life require very little extra keep until they are brought in for work, but certainly they thrive and grow better when this feed is continued during their second winter, as pastures will generally be too bare on well stocked farms during winter to afford sufficiency of fodder, without extra feed, to keep the young horses growing satisfactorily. Young horses also require very little housing, in fact, if well fed, they do quite as well out in the open fields, even during the depth of winter, and seldom, when left to themselves, do they avail themselves of the shelter of even an open shed, where provided, except to feed in. By treating them in this way most of the expense and trouble of attending to them is avoided, and so the cost of rearing is greatly lessened, whilst the intrinsic value of the animal, either horse or mare, when wanted for sale or work, is likely to be greater, owing to the better character and quality of its feet and limbs, through the constant exercise the colt or filly takes when at absolute liberty. There can be little doubt that boxing up foals and young horses has a great tendency to injure and contract their feet, also to, what is termed, "send them up on their pasterns," and so render them less valuable, as marketable produce, to the breeder. The origin of the swellings about the hocks that result in the formation of bog spavins is generally caused by strains or other injuries through the young animals indulging in a gallop when turned out of their box or stall into the fields, after standing confined there for a day or two, as is often the case when they are housed

the winter months. In fact, there can be little doubt orses of all ages are much safer and better out in the ıelds, if not required for work, than kept in boxes, stables, n draughty yards, and can then be maintained at con- ›ly less cost, both for labour and fodder, than when con- Besides, in the younger classes, the exercise they con- r get tends to develop to a great degree the muscular sation of the system, makes the animals of a more and robust constitution, and more fitted to withstand the ips and strain that after work and use entail upon the l system, especially of the draught or cart horse.

BREAKING-IN.

best time to break in cart horses is the early spring, and e autumn, as then when once got to work they can be t it with moderation all along until thoroughly manage- nd their shoulders are hardened. Whereas, in the autumn, ften varying periods of enforced idleness occur, owing to ency of weather preventing farm work being done, during time the young horses are kept standing. When put to ıgain they become a little unmanageable, and so contract ıbits and vices, but, if once made tractable and kept at nt daily work, they are not so liable to do. Besides this, nd is generally drier and lighter to work in the spring, es not cause so great a strain on the young animal, raw ıy be a little unsteady in its work. The various systems se breaking and stable management do not come under ıding of this article, and, as they vary greatly in different es, they will not be touched upon, especially as very little al information could be given.

STUD BOOKS.

re closing this paper, a few observations may be useful present value of Stud Books to the breeder of the t horse who follows strictly the defined lines of either the ır Clydesdale type.

e can be no doubt that during the last fifteen or sixteen through the authenticated and definite information on the ıg of horses given by the Stud Books, the value of the ıt breeds of cart horses has greatly increased; in fact, y go so far as to state that not a tenth part of the high paid these last few years, especially by our foreign ers, would have been otherwise obtained. Therefore it o be the aim of those responsible for the publication of

these volumes to give the fullest particulars of the breeding of each animal entered, as otherwise the information is, to a great extent, valueless. Even when these particulars are properly recorded, a Stud Book is of no practical use except to those breeders who, by careful study, make themselves acquainted with the historical character of the several animals whose pedigrees are given, especially when they have not had the opportunity of seeing the animals for themselves. This particularly applies to the registration of the female side of the pedigree, and no mare ought now to be regarded as of a distinct pure type, unless her pedigree can show a record of at least three "top crosses," as they are termed, from the foundation dam. To start the Stud Books many animals were accepted that were by an eligible or entered sire, and this was quite necessary. But now that this has been done and a wide foundation established, no further entries of mares should be received unless they fulfil the above-stated condition. Otherwise the fact of their being recorded in a Stud Book as of one or the other pure and distinct variety or breed, may give a fictitious value to animals that would be considered of only a cross bred character, that is, an animal which could not be relied upon with a fair degree of certainty to transmit its distinctive characteristics, and that these would be maintained and reproduced with the least practicable variation and without the danger of introducing qualities foreign to the breed. The time has now arrived when there should be added to the respective Stud Books an appendix, in which all mares that it would be desirable to eventually introduce into the category of either Stud Book as pure, but the breeding of which did not reach the specified standard, should be entered. These, in course of time, when the required number of recorded "top crosses" had been reached, would be eligible for entry as type or pure bred mares in the Stud Book proper. This would not only insure a greater value to recorded entries, but would also allow individual breeders the latitude, which many desire, of periodically infusing fresh strains of blood into their respective studs, without, at the same time, materially affecting the value of the pure bred stock with which the produce of these animals would probably be ultimately mated.

The Stud Books of the Clydesdale and Shire breeds of draught horses are comparatively of fresh foundation, and the time has now arrived for the respective societies to avail themselves of the benefit such a plan as here indicated would eventually prove. It is owing to the fact of some such scheme as this not having been adopted earlier in their history that the individual breeding value of true bred animals, both thoroughbred horses and Shorthorn cattle, is rapidly deteriorating. Now, to keep up

characteristics, "out crosses," as they are termed, of a too g or distinctive description, have to be resorted to. The t is that, in reaping the benefit which an introduction of blood in many cases frequently imparts, the family type, iality, or worth, is, as far as immediate use is concerned, tically destroyed; and, in order to regain this, recourse has again had to the use of the original root.

iis seems a very clumsy procedure, but, in such cases, it is the ssary way of attaining the desired end. Considerable time, must elapse before any material benefit can be reaped; reas, by putting into practice the suggestion proposed of blishing an Appendix, and so providing a registry for mares ot sufficient purity of blood to be eligible for entry in the l Book proper, a fresh supply of sufficiently well bred erial would be always ready at hand, and the valuable erties of our best breeding animals would be more easily ined. This would also act as a considerable inducement to ers and breeders, generally, to use only the best class of ion for their mares, even when these are not eligible for y in their respective Stud Books. At present owners of mares are tempted to use any stallion whose terms are ciently low to tempt them to disregard character and quality ne sire, and consider only the minimum cost of such service required to produce the foundation of an animal that may ermed, by some stretch of the imagination, a draught horse.

n concluding this article, it may be stated that the remarks, rring to the influence of the respective sex of the parents offspring, are made from a practical experience gained ng several years' breeding and management of all branches arm stock, and a close observation of the effects resulting n mating both animals and birds of different structural de- pment with their respective species, than which there is no e interesting and instructive study.

.—*Unappreciated Forage Crops.* By Prof. James Muir, of the Yorkshire College, Leeds.

RE are probably few who, on reading the title "Unappre- ed Forage Crops," will not, at the outset, have the impres- that such a subject is by no means an extensive one, one worthy of more than brief notice. Yet, upon con- ration, it will be no less evident that the chief difficulty,

in determining the range of a paper on the subject, is not in calling to mind which of our forage crops are unappreciated, but in satisfactorily deciding which of them may be left unconsidered, because their uses and value are fully understood and taken advantage of by the average farmer. As far as the ordinary root crops are concerned, and also as regards a few of the other forage crops, nothing need be said, for they are probably assessed at a sufficiently high value. But, when we consider the minor forage crops, we find a very different state of things, their growth, except in small areas, being rather the exception than the rule. This seems the more remarkable when it is remembered that, for a long series of years, the tendency of all the changes that have taken place in the farming of this country has been towards an increased production of meat and milk and a decrease in the area devoted to the less remunerative corn crops; yet the alterations in system to bring about that result have usually been either the labour saving plan of leaving the seeds down for several years, the expensive one of laying the land down to grass, or the ruinous one of letting the land lay itself away to a permanent crop of whatever grasses or weeds might happen to find place in the soil. Much of the permanent grass which has been laid down of recent years will probably never be of anything but inferior quality, owing to the unsuitability either of soil or climate, though by the growth of carefully chosen forage crops—chosen, that is, with reference to the soil and the requirements of the stock to be fed—the land might, in many cases, be made to produce a far heavier yield of food for stock, and one of a higher feeding value.

Living as we do, however, in a country the physical conditions of which are specially suitable for the growth of green crops, we scarcely realise how well off we are, or how important these crops are to us. In many hot climates, especially where the rainfall is comparatively slight, cattle have to be fed on material at which any English stockman would turn up his nose in disgust. Leaves of trees, often very dry and almost withered, and the roughest and coarsest of grass form a large part of their fodder, and this frequently without the possibility of adding any richer or more concentrated food. But, though so well off in the matter of food for stock, we cannot afford to neglect any of the means at our disposal for increasing the productiveness of our farms, for the wider our choice of crops the better chance we have of adapting our system of farming to existing conditions, and the greater the number of different crops that we grow, the better we guard against loss from a bad season.

erne (*Medicago sativa*).—To say much about the growth es of this plant seems almost unnecessary, yet it may be classed as an unappreciated crop, for though often ı the South of England, it is by no means universally and, in the more northern parts of the country, there is y rooted conviction that the climate is too severe for its tion. This is probably true to a certain extent, but, in orth West of England, and in some parts of Scotland, it en successfully grown, so that the limits of its culti- are certainly capable of extension. The feeding value crop is high, the following being about its average sition :—

	Per cent.
Water	75·3
Nitrogenous matter	4·5
Fat	·7
Soluble carbohydrates, &c.	8·3
Fibre	9·2

. it must always be remembered that the composition of lant will vary according to its stage of growth and ty. Moreover, a large proportion of these constituents stible, about two-thirds or rather more of the nitrogenous and soluble carbohydrates being digestible by ruminants, out half the fat and fibre, so that, altogether, lucerne aluable fodder, especially as supplying a large amount ogenous matter in an available form. It should be ed, however, that, after its earlier stages of growth, the tion of woody material increases perhaps more rapidly ı the case of most crops of the kind, and consequently gestibility of the whole plant is very much impaired. and frequent cutting is thus necessary and economical.

ng to its perennial habit, lucerne will amply repay a little taken in the preparation of the land. The soil best for its growth is a deep, rather dry one, containing a oportion of lime. Under such conditions the plant sends ge fleshy roots down deep into the soil, and so draws upon s of plant food untouched by the majority of crops. is same reason deep cultivation is useful as a preparation e lucerne crop, subsoiling being most effective. What- he preparation of the land, it must be clean; otherwise will quickly choke the lucerne. The amount of seed varies considerably, some sowing as little as 12 or 14 lbs. l per acre if the drill be used, or about 20 lbs. if sown ast, others using in the latter case up to 40 lbs. or even Under ordinary circumstances, about 15 lbs. drilled, or 25 lbs. sown broadcast, will do. The seed should be

drilled, so that hoeing and weeding may be easy and thorough for by this only can the life of the crop be extended over more than a few years. A most important point with regard to the management of lucerne is to avoid cutting or feeding it too late in the autumn. A moderately long stubble left then will protect the plant very much from injury by frost, and the comparatively early growth in the following spring will fully compensate for any lessening of food for stock in the autumn. A dressing of farmyard manure, applied soon after the last cutting is taken in the autumn, will also help to shelter the plant from the cold.

As to its uses, lucerne forms a good food for all kinds of farm stock, being generally more useful in a green state than when made into hay. In the latter condition the digestibility of its various constituents usually suffers, and this, together with the loss of valuable material which is inevitable in the process of drying, makes the use of green lucerne more economical than that of lucerne hay. The plant is also slow in drying, so that it is more than ordinarily subject to injury by the weather before it can be got into rick. In using lucerne in any form for feeding stock, it should be remembered what a large proportion of nitrogenous matter it contains (often more than the animal will require) compared to the quantities of the non-nitrogenous constituents, and therefore, to ensure the greatest economy in its use, it may be necessary to supply the stock with some food particularly rich in fat or carbohydrates, so as to adjust the proportion of the two classes of food-constituents to the needs of the animal body.

Usually, after a time, it will happen that the weeds begin to choke the lucerne in spite of the cleaning of the land and weeding which may be done before and during the growth of the crop. Gradually the crop will become less and less productive until it has to be broken up. But, as long as it occupies the land, it is benefiting it continually by bringing up plant food from the lower layers of the soil, part of which is eventually left at, or near, the surface as root or leaf residue, also by the power it has, in common with other leguminous plants of accumulating in the soil a supply of nitrogen derived, for the most part, indirectly from the air, thus adding largely to the available quantity of nitrogen; the most easily lost and, at the same time, most expensive element of plant food. Lucerne is therefore a true restorative crop, adding to the soil valuable material gathered from the subsoil and the air.

Kidney Vetch (*Anthyllis vulneraria*).—This plant, which also goes by the name of Lady's Fingers, is seldom cultivated in this country, though it has long been recognised on the Con-

tinent as a useful addition to our list of forage plants. It is of special value for growth on light dry soils, sandy, and even gravelly land, provided that a certain amount of lime be present. Indeed, on the dry brashy soils of the oolite, and on the chalk, the plant is indigenous, and may commonly be found growing at the roadsides. The wild form of the plant, however, does not present the useful characteristics that have been obtained in the cultivated variety. The latter is a much larger plant, having greater leaf development, and being comparatively free from hair. The feeding value of the cultivated plant is thus greater, owing to the relatively small proportion of stem, while stock of all kinds eat it much more readily because of its freedom from hair. The character of the soil and season, however, will affect the quality of the plant. Its average composition has been stated as follows:—

	Per cent.
Water	81·0
Nitrogenous matter	2·6
Fat	·5
Soluble carbohydrates	9·2
Fibre	5·5

The percentage of nitrogenous matter is rather low, remarkably so for a plant of the leguminous order; but, as partial compensation for this, the amount of fibre is small, and the digestibility is fairly good. The chief use of the plant, however, is not so much to produce green fodder of high value as to yield a large quantity of useful material on soils that would not bear remunerative crops of any other kind. A further point of considerable value is that the kidney vetch may be fed off or cut quite early in the season, as it begins growing before most of the more common crops, and thus gives a good bite at the critical time when the winter food is finished and the spring crops are hardly ready. Feeding the crop off early does not injure the plant in any way, for it will soon begin growing again, and yield one, or possibly two, more crops in the course of the season.

Succeeding, as it does, on soils little suited for the growth of clover or grasses, the kidney vetch is well adapted for sowing in rotation to take the place of "seeds," more especially as the land does not easily get "sick" of the crop, so that it may be sown at comparatively short intervals. It may be used either for feeding off or soiling, or it may be cut and made into hay. It is, however, very likely to be injured in the drying, as the finer leaves easily break and are lost, in which case the proportion of woody stem is increased.

The kidney vetch is a hardy plant, suffering little from

drought, though, in a dry season or soil, there is often more hair upon the leaves. It is able to withstand any degree of cold met with in this country, while, owing to its strong and deep root development, it is not injured by stock grazing upon it. In wet land, however, whether wet from want of drainage or because of the retentive nature of the soil, it will not thrive. Though succeeding upon poor sandy land, it gives remunerative returns in answer to the application of dung, particularly where the dung has been applied to the land some time before the seed is sown.

The seeds being rather small, the kidney vetch should be sown in a fairly fine seed-bed. It may be sown with a corn crop in the spring, just as are the clovers, or early in the autumn on a stubble, the seed being drilled or broadcasted after the stubble has been harrowed, as trifolium is often sown. In the former case, the plant makes so little growth during the first season as to be useless for either cutting or feeding, but early in the next year development begins, and the first crop is obtained sooner than where the second method of cultivation is adopted. In either case about 16 to 18 lbs. of seed will give a good plant if the drill be used, though, of course, more will be required if the seed be sown broadcast. If the crop is to be used only for cutting, it has been found better to cut it quite early in its growth, the plant being thus kept in a more vigorous condition, so that it begins to grow again very rapidly after cutting. If, however, the second crop is to be grazed, it is found preferable to cut the first at, or even a little after, the time of flowering, for by this means the second growth is made to consist of leaves only, a second crop of flowers not being developed in a single season. In the same way, if the kidney vetch is required to occupy the land for more than one season, it is advisable, as far as possible, to prevent it from producing flowers, for in this way its strength is preserved instead of being exhausted in the formation of flowers and seed.

Serradella (*Ornithopus sativus*).—This, as far as quality and feeding value are concerned, takes a very high place amongst forage crops. The following is stated to be its average composition:—

	Per cent.
Water	82·0
Nitrogenous matter	3·0
Fat	·7
Soluble carbohydrates	7·0
Fibre	5·7

The proportion of water is large, and this makes the percentage of all the other constituents appear low. The amount of nitro-

genous matter is high, however, compared with that of the non-nitrogenous substances present, so that the value of the plant for feeding purposes is considerable, especially as the food is easily digested, about 70 per cent. of the nitrogenous matter and 60 per cent. of the fat being digestible by ruminants. When made into hay, its composition compares even more favourably with other forage crops than when in the green state, as the following figures, giving the average composition of clover hay and serradella hay, will show:—

	Clover Hay. Per cent.		Serradella Hay. Per cent.
Water	16·7	....	15·0
Nitrogenous matter	11·0	....	15·2
Fat	3·2	....	1·7
Soluble carbohydrates	32·9	....	31·6
Fibre	29·9	....	29·3

The comparison will be more easily made perhaps if the composition of the dry material only is taken into account. The following figures express the composition of clover and serradella hay, reduced to a water free basis:—

	Clover Hay. Per cent.		Serradella Hay. Per cent.
Nitrogenous matter	13·2	....	17·9
Fat	3·8	....	2·0
Soluble carbohydrates	39·5	....	37·2
Fibre	35·9	....	34·5

It will be seen from the above that, while clover hay is considerably richer in fat than serradella hay, and contains rather more soluble carbohydrates, the latter is a good deal richer in nitrogenous matter, and has the advantage of containing a smaller proportion of fibre. This very large proportion of nitrogenous matter, as compared with that of the non-nitrogenous substances present in serradella, must be remembered when it is given to stock, and, as in the case of lucerne, the greatest economy is attained when it is employed with some other food containing a large proportion of carbohydrates or other non-nitrogenous material.

Against the great value of the plant due to its composition must be set the fact that it generally produces only light crops, so that its use is not advisable on land rich enough to produce a fair crop of a more bulky forage plant; but on rather poor sandy soils serradella thrives well, suffering very little from drought, having the valuable property of retaining its soft succulent nature until flowering is quite over, and of only becoming objectionably woody quite late in its growth. Its cultivation is very simple. The seed is drilled in a moderately fine tilth

about April or May. The rows should be rather close together, or the plant will not properly cover the surface, and the weeds will perhaps choke it. If, on the other hand, the rows are closely drilled, hoeing or cleaning the land during the growth of the crop will be unnecessary and indeed, except just at first, impossible.

Wood Vetchling.—A variety of this plant (*Lathyrus sylvestris Wagneri*) has recently been introduced as a forage crop into this country. It has been developed by careful cultivation and selection from its wild prototype, and in Germany, whence it originated, enormous yields of food for stock, of very high quality, are reported to have been obtained. In this country, however, the results as yet obtained have not fulfilled the expectations raised by the accounts from Germany, but show rather that, as far as the weight of produce is concerned, the wood vetchling is only on a par with other forage crops, and indeed is inferior to several. The feeling of disappointment thus caused has created a prejudice against the crop in spite of the merit it undoubtedly possesses. In an experiment carried out on a small scale at Cirencester, the first cutting, taken in the second summer after sowing the seed, when weighed in the green condition, yielded at the rate of 11½ tons per acre, after which the second crop began growing almost immediately. As to the composition of the crop, the hay produced in the above experiment is reported by Professor Kinch to have given the following results on analysis:—

	Per cent.
Water	13·68
Nitrogenous matter	24·75
Fat	2·13
Soluble carbohydrates	30·25
Fibre	22·90

These figures show the hay to be remarkably rich in nitrogenous matter, while the proportion of fibre is low.

The plant may either be sown in drills on the land, or first in a well prepared seed-bed, the plants being afterwards planted out into their permanent position. The former method is perhaps preferable, for the plant is sufficiently hardy, and labour is saved by not having to plant the seedlings out. During the first year little produce, if any, can be expected, but as the plant becomes stronger and covers the ground the yield becomes satisfactory.

Bokhara Clover (*Melilotus alba*) only deserves mention here because a good deal has been written and said in some quarters in its favour. In appearance rather similar to lucerne, it is only natural that it should be thought worth a trial as

a forage crop, for its large bulk commends it to many, and atones for its less obvious defects. Unfortunately these defects are considerable, and very much impair the usefulness of the plant. First, the plant is tall and coarse growing, having a large proportion of stems which become hard and woody early in its growth, so that frequent and early cutting is necessary. Moreover, it contains a large amount of cumarin, the material which is chiefly responsible for the sweet smell of good hay. This substance, though sweet smelling—a fact which causes Bokhara clover to be called sometimes "sweet" clover—has a peculiar bitter taste, so that when present in any quantity it renders a food unpalatable to stock. Consequently this plant cannot be used alone, either as hay or in the green state, for feeding, but must be mixed with, at least, two or three times its weight of other less highly flavoured material. The average composition of the plant in its green state is given as follows:—

	Per cent.
Water	87·5
Nitrogenous matter	2·9
Fat	·4
Soluble carbohydrates	3·5
Fibre	3·6

Owing to the large amount of water the actual amount of the other constituents is small, but the very large amount of nitrogenous matter present compared to that of the non-nitrogenous substances is worthy of notice. On the whole, however, taking into consideration the points touched upon above, Bokhara clover is not a plant to be recommended for farm use.

Lupines.—The yellow variety (*Lupinus luteus*) has at times been highly recommended as a forage crop. Its advantages are great for use under certain conditions. First and foremost is its power of producing a heavy crop on very dry soils. No blowing sand is too loose or dry for the plant, and the late Dr. Voelcker quoted an instance of a crop of 21 tons per acre being obtained from a soil which on analysis showed that more than 95 per cent. of its weight consisted of insoluble silica, most of which was quartz sand. In addition to this, the composition of the plant is indicative of considerable feeding value, as will be seen from the following:—

	Per cent.
Water	85·7
Nitrogenous matter	3·1
Fat	·3
Soluble carbohydrates	6·2
Fibre	4·0

The proportion of nitrogenous matter is very high, forming no less than 21·7 per cent. of the dry substance. About three-quarters of this is digestible, and still more noticeable is the fact that about the same proportion of the fibre is also digestible, an amount much in excess of that digested in the case of most fodders. Unfortunately, the value which the plant should have, owing to its suitability for growth on sandy land, and to its composition, is very much diminished by the presence of large quantities of alkaloids. These give such a bitter flavour to the plant, either when green or dried, that most kinds of stock refuse to eat it. Sheep, however, are an exception, for they eat it readily, and, if they are fed on lupines together with other less nitrogenous foods, they do well. It will also be remembered that consuming such a nitrogenous crop on the land is a method of improvement peculiarly adapted to the kind of soil on which the lupine grows best. A further disadvantage to the use of the crop for feeding purposes is that there are numerous recorded instances of stock being poisoned by it. This has usually been attributed to the large quantity of alkaloids present. But it has also been suggested that the effect is due to the presence of a fungus in or on the plant, for it is at least doubtful whether the amount of the alkaloids is sufficient to produce the effects observed. The question, however, is by no means settled at present.

The seed should be sown rather deep, at the rate of about 1½ or 2 bushels per acre, in drills about 1 foot apart. A light dressing of farmyard manure, spread on the land just before the land is ploughed for the crop, will be well repaid, but forcing or heavy manuring should be avoided. Drilling should take place some time in April, and should be as early as the season will allow, because the seed is slow in germinating, and the plant also makes little progress for some time after it has appeared above the ground, so that it will be late in the season before the crop is ready for cutting or feeding unless the seed be sown in good time. This slowness of growth in the early stages of the plant's life will often make some hand hoeing or horse hoeing necessary, but of course it must be deferred until the plant shows above the surface.

Furze or Gorse (*Ulex Europæus*).—This plant like the last, is not of universal value, but, under certain conditions, may be employed with advantage. It may be grown successfully on soils too poor, and in situations too elevated or exposed, for almost any other valuable crop; but, where the soil and climate are suitable for the healthy growth of the more usual plants, it will generally not be economical to cultivate furze. It grows best on sandy, gravelly or rocky land, and so is well

suited for hilly districts. The chief drawback to its use is, that in its natural condition all kinds of stock refuse to eat it unless compelled to do so by starvation, owing to its harsh and prickly nature. This is a serious objection to the plant, for if used on any but a very small scale the labour of preparing the food for use is considerable, whether it be done by beating it with wooden mallets or by a specially designed machine, somewhat akin to a chaff-cutter. The following is the average composition of furze:—

	Per cent.
Water	72·0
Nitrogenous matter	3·2
Fat	1·2
Soluble carbohydrates	8·2
Fibre	13·3

The amount of water is remarkably low compared to most of the forage crops when in the green state, yet it will be seen that the amount of valuable food material compared to the total amount of dry substance present, is not so great as in many forage plants. It should also be noticed that the percentage of fibre is high relatively to the more valuable constituents of the fodder, a point having an injurious influence on its digestibility and value. Stock, however, eat furze very readily when it is prepared for them, and it is available as winter green food, thus gaining a special value by coming in for use when succulent food is often scarce. For cows in milk it is said to be particularly useful, and to improve both the yield and quality of the milk.

Land intended to be sown with furze should be worked to a fine tilth by autumn ploughing and thorough cultivation in the spring, and the seed drilled, either by itself, or sometimes with a corn crop, just as clover or grass seeds are usually sown. About 12 to 15 lbs. of seed per acre, drilled in rows 12 or 13 inches apart, gives perhaps the best average results, but individual practice varies widely, both in the quantity of seed sown and the manner of sowing it. The land will need to be kept clean during the growth of the crop, especially during the first year. In the first season after sowing there will be no return, the first cutting being obtained about a year and a-half or rather more after the seed was put in, but after that it will yield one cutting each year of 12 or 13 tons of green food. In fact, it is necessary to cut it every year, or the furze becomes too hard and woody for use, and, if still further neglected, it may possibly require to be burnt and resown.

Prickly Comfrey (*Symphytum asperrimum*).— There is, perhaps, as much difference of opinion as to the merits of this plant as about any crop grown, and, as far as can be gathered, these differences of opinion correspond to actual differences in

experience. On the one hand, we hear of the bulk and feeding value of the crop; on the other, of its coarseness and lack of palatability. There is, undoubtedly, some difficulty in getting stock to take to it at first, but this may usually be overcome by the simple expedient of sprinkling meal over it until the animals become accustomed to its rough character. It is also true that, after the flower is formed, the plant becomes woody and loses much of its feeding value. The crop is, however, quite bulky enough before flowering begins to make it worth cutting, and early cutting preserves the strength of the plant, and causes the second and subsequent crops to be heavier and more rapid in their growth. The composition of the plant is as follows:—

	Per cent.
Water	90·66
Nitrogenous matter	2·72
Fat	·20
Soluble carbohydrates	1·28
Fibre	3·30

The proportion of water is high, thus diminishing the value of the plant, and adding to the cost of cutting and handling it. Beyond this, there is nothing noteworthy, except that the proportion of nitrogenous matter is rather large.

The special use of the crop is not so much for growth on an extended scale as to fill up odd corners of unoccupied land. Moreover, it will thrive under trees, and so may be used where nothing else would succeed. The crop is usually grown from sets, and its cultivation presents no difficulties, for it is a hardy plant and deep rooted, not suffering seriously from either cold or drought. The plants are put about 2 feet apart each way, and the spaces between will require hoeing for a time. Later on, however, the strong growth of the comfrey will make this less important. Usually three cuttings will be obtained in the course of a season, often more, and the total weight of the crop will range from 20 to 50 tons of green fodder per acre, though sometimes a single cutting will yield more than 20 tons.

Tall Oat Grass (*Avena elatior*).—This plant, which is also called the False Oat, is, in many districts, a common weed in the hedgerows, and perhaps the very fact of its being so common has caused it to be neglected. Yet it is a valuable fodder plant when both its bulk and composition are taken into account. The following is its average composition:—

	Per cent.
Water	74·1
Nitrogenous matter	2·1
Fat	·6
Soluble carbohydrates	12·7
Fibre	8·8

Being a gramineous plant, the chief constituents of value re, as might be expected, the non-nitrogenous substances; thus listinguishing it from the foregoing crops, most of which belong o the natural order Leguminosæ. This difference in the relative proportion of the nitrogenous to the non-nitrogenous material is mportant and affects the method of consuming the crop and the kind of food required to supplement it.

On dry soils, and particularly on those where lime is abundant, the tall oat-grass grows freely. It is not injured by rought, and, even in the driest seasons, produces a bulky crop, hough one which hardly weighs as heavily as would be expected, owing to the thinness of the walls of the stem. The ard and dry texture of the plant detracts somewhat from its alue, and it has a slightly bitter taste. In spite of these rawbacks, however, it is well worth cultivating where the soil nd climate are adapted for its growth.

Awnless Brome (*Bromus inermis*).—A few years ago this lant was introduced into England under the name of Hungaan Forage Grass, but, up to the present time, it has not been xtensively cultivated. When the climate and soil are suited r the growth of the usual grass crops, it will not, as a ule, be advisable to grow the awnless brome, for even under hese circumstances it does not produce such a heavy crop as many other plants that could be named. But on dry shallow oils, where the majority of grasses will only yield a very small rop, it gives good returns, and only under these circumstances an it be recommended.

The composition of the plant is good, as shown by the following analysis:—

	Per cent.
Water	78·1
Nitrogenous matter	3·0
Fat	·4
Soluble carbohydrates	10·2
Fibre	5·7

The proportion of nitrogenous to non-nitrogenous material s rather high, higher than might be expected in a grass, hough the total amount of actual food material is not so high s in some of the plants already mentioned.

Schrœder's Brome (*Bromus Schrœderi*).—Nearly allied to he awnless brome, Schrœder's brome was introduced into this ountry at about the same time. In its characters and requirements as to soil and climate, it is very similar to the awnless brome, but produces a bulkier crop of rather coarser quality. This makes early cutting essential, and renders the plant more suitable for use as green food than for making into hay. It is

not a permanent plant, and should be grown for cutting during one season, though it will frequently yield a moderate crop the first autumn after it is sown.

Maize (*Zea mais*).—In other countries where the heat of summer is greater than it is with us, maize is constantly cultivated as a forage crop, and the accounts given of its value and the enormous weight of fodder produced sound almost fabulous, being so far above anything to which we are accustomed in this country. It is therefore only natural that attempts should have been made from time to time to introduce the plant into this country as a farm crop. The results, however, of all trials hitherto made have merely served to establish the fact that, in the English climate, it is too uncertain a crop to be recommended for general use. The late frosts, which we so often experience in the spring, injure, if they do not altogether destroy, the maize plant, so that the seed can only be sown late in the season. Then, again, growth ceases as soon as the frosts begin in the autumn, so that the period of growth is very short in an average season, and we do not have enough sunshine and hot weather to compensate for the shortness of the summer. Therefore, though in specially favoured spots very large crops have occasionally been obtained, there have been many failures and many miserably small returns, so that it is not to be relied on. When the crop does well, it produces a close thick growth, perhaps 8 or 10 feet high, but more commonly a sparse crop about 3 or 4 feet high is obtained. In composition maize is not a particularly rich food, as will be seen from the following analysis:—

	Per cent.
Water	84·0
Nitrogenous matter	1·4
Fat	·5
Soluble carbohydrates	8·4
Fibre	4·7

This deficiency of valuable substances in the fodder is partly compensated by the rather high digestibility of all the constituents, from two-thirds to three-fourths of each being capable of digestion by ruminants.

A warm soil with a southerly aspect should be selected for the growth of the crop. Some lime in the soil is required, so, unless it be present naturally in the land, it must be added. The seed is usually drilled or dibbled in rows about two feet apart, and is sown some time in May or even early in June. A dressing of farmyard manure should have been applied to the land in the previous autumn, and when the seed is sown a top-dressing of nitrate of soda or sulphate of ammonia will give good results, especially if some superphosphate be given with it. Flat maize

ppears to yield heavier crops than the round variety, and after owing the greatest care must be taken to protect it from rooks, which not only take the seed, but also pull up the young plants fter they have appeared above the surface. The crop should be ut before it loses its green colour, and should be chaffed before eing given to stock.

Sorghum (*Sorghum saccharatum*).—This is a plant very imilar in appearance to maize, though not so tall and strong in ts growth. In most of its characters it resembles maize, and what has been said as to the uncertainty of the latter also pplies to sorghum. Its composition is a good deal superior, however, viz.:—

	Per cent.
Water	76·2
Nitrogenous matter	2·5
Fat	1·2
Soluble carbohydrates	12·2
Fibre	6·8

The digestibility is high, particularly that of the fat, of which on the average 85 per cent. is digestible. Owing to the uncertainty, however, which attends its growth, sorghum cannot be ecommended for general use in this country.

Many other plants might be classed as unappreciated forage rops, but those already spoken of are the chief. One word in onclusion, which, though obvious, is frequently forgotten by nthusiasts. There is no such thing as a crop that will give he best possible result under all circumstances. Those menioned in the foregoing pages have their special use under ertain conditions, but unless those conditions exist it by no neans follows that their growth will be advisable or economical.

V.—*The Influence of the Sire in the Development of the Dairy Industry.* By ALEXANDER MACDONALD.

It is generally accepted by stock-breeders, as an axiomatic truth, "that a good sire is equivalent to half the herd." It is indeed true that the reproductive influence of the male is usually greater than that of the female; and he exercises a prepotency of reproduction in proportion as he is well-bred and impressive. Prepotency he certainly ought to possess if his pedigree and personality are uniformly good. The word good in this sense is a relative term. In fact, it is vague; too vague and elastic in its significance to bear, with accuracy, the meaning which it is especially intended to convey. But let it stand as a rear-ward

synonym of superiority of blood and correctness of type. Tl are the two main essentials to the perfect development of one of the many breeds of pedigree stock of which Great Bri is the proud possessor.

VALUE OF PEDIGREE.

At the request of the Editor of this 'Journal,' I venture a remarks on the influence of the bull in the development of dairy industry. If there is one unfinished point in the g enterprise of bucolic refinement, the designer of this subject obviously discovered it. The influence of the sire, as a rul seriously underrated. Especially is this the case in develop the dairy properties of the various breeds of pedigree cat Although there are instances of careful attention having b given to the selection of the bull for the dairy herd, these are the exceptions that prove the rule. Bakewell was a keen sc tineer of hereditary fitness in the male as well as in the fem and lived to reap much of the reward of his skill. Mr. I. Edwards and Mr. Chas. Hobbs have shown great wisdom forethought in the same direction in our own day; but tl excellent example is not so widely and generally followed a should be. And why? It surely cannot be that British d farmers discount the value of pedigree, or misread the tests time. No country in the world has more thoroughly tested power of pedigree than the United Kingdom. No countr may be affirmed with equal truth, has taken the position has done. Great Britain has hitherto maintained a tower superiority over the most progressive of the younger count opening up around her—countries whose agricultural devel ment has latterly been creating much uneasiness amongst hard-stricken victims of the prevailing depression. If she i continue to maintain supremacy in live stock, however, tl must be no disloyalty to the cause of heredity. Dairy herds multiplying with mushroom rapidity. The exceptionally prices of cereals have sent a sort of dairy mania over the l with the result that classes for instruction in the arts of bu and cheese-making have been started in almost every count the United Kingdom. All this but serves to enhance the portance of the subject I have reluctantly taken in ha because, unless careful attention is bestowed on the selectio the stock, both male and female, there would be an inevit sacrifice of lacteal fertility to nominal expansion and illu growth. Let the dairy industry expand as it may, there n be no slackening of personal effort for the cultivation and provement of individual productiveness in the herd. That tl

n for improvement will be generally admitted. Is it not iating to think that we, as a nation, are so largely depen- upon foreign resources in the production of butter and ? However limited our capacity of corn-growing, com- with that of many other countries, there should be sufficient in this humid climate of ours, under just and fair grounds ıpetition, for keeping the foreigner at bay in the production ıpply of dairy produce.

; we cannot reap grapes of thorns, or figs of thistles! The ssential to improvement is a knowledge of the tribal his- of the several dairy breeds. Certain strains have deeper ng qualities than others, even of the same breed, and it is ore necessary to study, not only the characteristics of the s as such, but to ascertain the peculiarities of the different ies or strains in each breed, and to unite and develop to the best possible advantage. This could be easily done, mers would only make an effort to acquire the necessary ledge. But there still exists in many quarters a strong lice against the use of pedigree in dairy stock. It is com- y believed that a practical man—*i.e.* a farmer accustomed ıl in dairy cattle—can judge better of an animal's value by ppearance than its pedigree. That may, indeed, be true in cases, but appearances are often deceptive; whereas, if dairy farmer resolutely determined to consult heredity— ok beyond mere physical discernment—in selecting his , especially the stock bull, the responsibility of the eye l be greatly reduced, and the progress of his particular it accelerated. The bull should not only be pure-bred, onnected by descent with some well-established dairy s of blood, and should, if possible, have an exceptionally milker for his mother.

PRINCIPLES OF BREEDING.

; breeding of dairy stock, at least in so far as the bull cerned, ought to proceed upon lines strictly in accordance the highest principles of pedigree stock breeding. Some s are of greatest service in their purity, and cannot be ved by any method of crossing yet discovered. There hers, however, which can be, and are, made more profitable iry purposes by an interfusion of blood from some different . But in every case the employment of the cross-bred nt should be confined to the female stock. In the county mberland, where dairy farming is extensively carried on, bred, or rather non-pedigree, bulls are considerably in r. The farmers are indifferent as to their ancestral record

provided they are the sons of good-milking mothers. Soı
times they do very well, better occasionally than more fashi
ably bred stock, but there is always an uncertainty as to
results of their use on cross-bred cows. There is an old
very true saying, that two blacks will never make a wh
the union of cross-bred stock can never evolve an abiding t
of animal or reliable dairying properties.

It may occur to some people that there is little use in best
ing great care on the selection of the bull while it is impossi
in the majority of dairy herds, to maintain anything like
formity of breeding and merit in the female stock. Dairy he
it is true, are continually ebbing and flowing numerically.
certain number of cows have served their period of profit,
others must be found to replace them. A great deal ma
done by a skilful dairyman, who knows the points of a g
dairy-cow, to insure a satisfactory substitution for the anin
being sold, but he cannot depend to a great extent upon
breeding of the animals unless it is actually familiar to l
Of course, there are points in a cow which signify good mill
qualities—which, indeed, rarely belie their significance. In
bull, these points may be dimly reflected, but cannot be re
upon to the same extent. This, therefore, implies the supr
importance of the bull, at least, being pure-bred, and of g
"dairy" descent. If it should be difficult, or even impossi
to preserve distinct breeding and milking records in an e
varying herd of dairy cows, there can be no risk of h
resulting from the use of a bull which combines a good p
pedigree with all the external features of a successful dairy
Half a loaf is better than none. It is conceivable eno
moreover, that the persistent use of the best bulls both
blood and type would, in course of time, not only overth
defective points in the mongrel cows, but crystallise the
ones to substantial and enduring purpose. For, presuming
my contention from the outset of this necessarily hurried p
is correct—that the bull is equivalent to half the herd-
sire has much to account for in whatever results from his
Although the cows, especially cross-bred animals, have a pr
ness to throw back to the likeness of previous impregnati
it is not usually from the maternal side of their ancestry
they inherit this reverting tendency. It is my firm belief—
I speak with considerable experience—that the bull governs,
very large degree, the forces of atavism. Assuming then that
is the case, it is assuredly the duty of every dairy farmer-
duty to himself and to the dairying community as a who
to convert the dangers of deterioration, through this proce
reversion, into certain accessories of continuous improvem

whatever the tendencies of reproduction, by using bulls now that will not disgrace the atavistic calves of future years. Had the breeders of dairy cattle in past generations exercised the precaution I am attempting to inculcate here, and which many abler pens have inculcated before, there would have been little or no cause for apprehension as to the results of atavism; less room for improvement in the general dairy stock of the country, and less reluctance in adopting suggestions of reform, which practical experience may, and does, inspire in the more observant and progressive dairymen of to-day.

Principles of Selection.

It is well to remember that "What is bred in the bone stays long in the flesh." A bull perfect in the points of his breed "is as superior to a deficient one, used even on common or grade cows, to a certain extent as to breed on thorough-breds; and an inferior one should not be used at all; better pay a round price for a good bull than take a poor one as a gift." These are the words of no less a celebrity than the late Mr. Lewis F. Allen, Buffalo, N.Y., than whom no higher authority on live stock breeding probably ever lived. It was Mr. Allen's opinion, moreover, that a bull chosen for service in a dairy herd "should bear in himself the dairy marks or points—for they show in the bull as well as in the cow—and he should be descended, on the side of both his dam and sire, if possible, of good milking ancestors. His head should be small, his fore-parts lighter in proportion than his hind quarters, as in the cow; yet he should be vigorous and of sound constitution and well-formed throughout. Examine his scrotum and see that the embryo teats on the sides of it are well, squarely, and uniformly placed; that his twist (space between thighs) is wide, with yellowish skin and soft to the touch, and it may be reasonably assumed that such a bull, with well-selected cows of the common or grade varieties, will produce good milkers." Such are Mr. Allen's suggestions as to a model dairy bull. They are very good so far as they go, and can, doubtless, be corroborated by most practical dairymen in this country, yet I hardly think they sufficiently cover the ground they attempt to cover. As a general guide to the selection of a dairy bull there is little to be added, save, perhaps, a fresh tincture of emphasis to the significance of a fine soft skin and massive coat of hair. But, in a note received from Mr. Chas. Hobbs of Maisy Hampton, there is a suggestion of greater importance even than any one of those enumerated by Mr. Allen, viz.: "That dairy farmers should make a point of not only studying the pedigree of the

bull's mother, but of personally seeing her, and carefully examining her before investing in the bull." In the same communication, Mr. Hobbs also indulges the sanguine belief "that the sire has a great deal of influence in either producing good or bad milkers."

Mr. I. N. Edwards's renowned dairy herd—recently dispersed—was a conspicuous, but all too solitary, example of an ideal dairy herd. This was so both as regards the purity and high character of his stock and the masterly skill with which he conducted the affairs of the dairy.. He put well to the test every animal in his possession, and kept an exact record of results that enabled him to weed out, upon thoroughly practical and reliable grounds, any of them that did not attain the requisite standard of production. Mr. Edwards has sent me the following letter which will be read with interest:—"I can only try to prove to you the old adage that 'like begets like,' and in no case is it truer than in milk production. I have made it a rule never to use a bull unless I have traced his dam, and am satisfied with her milking properties; and I am sure that the bull either makes or ruins the herd. I have found from experience that the produce of a good milker by a sire whose dam was a bad milker is never so good a milker as her dam. I have also found that the produce of a good milker by a sire whose dam is a good milker are always as good and, in many cases, much better milkers than their dam. This can only be actually proved when the milk is carefully weighed each morning and evening. There is no use in taking the milkman's word, for it is all guess work with him. In selecting a bull for my own herd, I have a few fads which I go by, and I really believe there is something in them. The head should be the shape of a wedge and not too 'bully'; eyes full and lusty; legs fine and not too long; tail long and thin, the bone well below the hock; the udder well shaped and of good colour; hair long and not too fine, but nice and soft and thick; horns rather thin and well set back on the head."

Many breeders of dairy stock pin their faith very largely to the development of what is known as the escutcheon. They maintain that it is an infallible sign of dairy qualities, and that it applies to both sexes. I confess I have never been able to fully acquiesce in this opinion. There are points, as I have already indicated, however, which unquestionably denote suitability for dairy purposes, both in the male and female. The majority of these points are more pronounced in the female than the male; and, if there is any virtue in the escutcheon theory at all, this is especially true of it. The arteries in the bull corresponding to the mammary arteries in the cow are but slightly developed, as

f intended only for coverings of the testicles, and the escutcheons o-called are of small extent. But let it be generally accepted s an established fact that the male and female bear a more or ess striking similarity to each other in type, touch, and colour f skin. Where dairying, pure and simple, is the sole object, herefore, the principle of selection of the one will be mainly pplicable to the other. If, however, the farmer's object is a lual one—*i.e.*, both dairying and stock-raising—it would be vell to guard against effeminacy in the bull. Masculine character is an important characteristic in a general purpose, or, t even may be, in a dairy, sire. By this I mean bull-like ppearance, which, while it admits of refinement in purely dairy tock, is a sure indication of strong constitution and sexual rigour—two points which even the most irrepressible Guenonite, owever much he may underrate them, cannot afford to overlook. Nor is the policy of breeding purely for milk and butter—or ather for immediate dairy results—a course to be encouraged. He stands in his own light and on a foundation of sand, who ims simply at forcing the natural propensities of his cows and ppraises the value of a sire by immediate effects at the pail. A reasonable length of time must be allowed for the evolution f improved blood. Although the cultivation of lacteal fertility in the cow is a primary object, it is not, by any means, he only desideratum involved in the development of the dairy. There is a stage beyond the dairy in the life even of milk-giving tock. The ultimate destination of the dairy cow, as well as of Christmas beeves, is the shambles; and as a high-grade cow vill, as a rule, put on a considerable weight of beef after she as served her day at the pail, the risk of making the most of er in that particular direction need not be incurred if sufficient are is exercised in the selection of the bull. But don't be in a urry or impatient for results. Get a suitable sire and stick by im as long as it is practicable to do so. It is significant, in ooking back through the history of such herds as those of Mr. Hobbs and Mr. Edwards, to note how few bulls they have used s compared with the majority of other breeders. The explanaion of this is that they examined well the bucolic tree from which they engrafted sprigs upon their herds, and patiently waited the results. Supposing a bull joins the herd at fifteen nonths or twenty months of age, there is no reason, if he is not overtaxed, why he should not continue to be used where fresh cows are always being bought in, for ten or more years; and he may even be used to some extent upon his own daughters and grand-daughters if the experiment should appear likely to answer. I dislike in-breeding on principle, and do all in my power to discourage it, but the fact remains that by the

concentration of good blood in this manner wonderful results have often been obtained. But this practice, though advocated by some of the most eminent breeders and live stock authorities both in this country and America, is by no means one to be indiscriminately encouraged.

The difference in the type of a good dairy sire and a purely "beef" sire of the same breed, is not necessarily very striking. Most dairy farmers object to thick beefy thighs and thick head and neck. Take a typical Shorthorn as an example. This animal is a grand embodiment of all the animal virtues that minister to our human needs—whether through the block, the churn, or the cheese press. But even Shorthorns vary in degrees of usefulness, and their very "all roundness" but intensifies the difficulty of selecting the most suitable sire for any specific line of pursuit, unless the pedigree and breeding record of the animal can be distinctly traced through several generations. The Channel Island cattle, though latterly they have attracted some attention as beef-growers, are essentially dairy breeds and nothing more, with, of course, much more pronounced dairy characteristics than some of the more widely known breeds of cattle. The bulls of these breeds are quite as strikingly marked as the cows, and in America the greatest importance is attached to their individual appearances and pedigrees, some of the pioneer dairymen of the States going the length of keeping what they call a "bull record." This system is simply an extension of the milking records per cow, kept in some of the most ably managed dairy herds in this country in order that the relative powers of the male may be noted, as well as those of the female.

MODELS FOR DAIRY SIRES.

In connection with this advanced and very important system of registry, Mr. T. L. Hacker, a well-known American dairyman, has prepared the following interesting communication, furnishing an object lesson of the highest importance to the dairy farmers of the United Kingdom :—

"To know the correct form for a dairy sire is a very important matter to the breeder of dairy animals, and illustrations of dairy breeds should not fail to carefully delineate those forms peculiar to the best specimens of the breed. When the subject is an animal whose meat is the food product, or whose strength or endurance are results desired, there may be no serious objection to the padding out of apparently a little deficient parts, as this is educating the eye in the right direction; but the practice is entirely wrong and detrimental when applied to the dairy breeds.

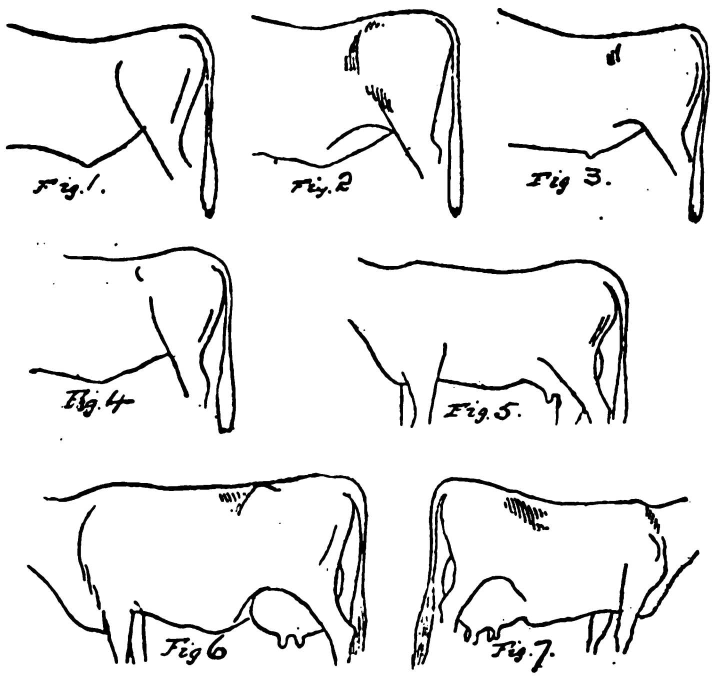
The form which gives the greatest degree of activity to the dairy functions is decidedly angular, and in so much as it deviates from this form it deviates from the highest type. Many who are deeply interested as to what is the best form for a dairy sire are still groping in the dark, and really know no standard further than what the pedigree reveals; and while breeding is an important and indispensable factor in the composition of the sire, yet if his physical contour is not in harmony with his breeding he is objectionable. A few years ago I met a noted breeder of Jerseys at a fair who was the owner of a successful dairy sire, and desiring to study his form, I expressed a desire to see him. He remarked that he left him at home, as he was not a good show animal; and in answer to the inquiry, why he was not a good show animal, he replied he was so thin in flesh, his middle swayed down, and that his hind-quarters resembled more the stern of a scow than a fine animal; and he was really so hard to handle that he dreaded to take him out. This was a pretty good description, as far as it went, of a good dairy sire. And in his stead he exhibited one straight and plump, but that had never amounted to anything. Now this is educating the public in the wrong direction.

"It is fair to assume that our most successful dairy sires are the best models, and by studying their forms we find that there are certain features common to them all. Fig. 1 is an outline from a photograph of Major Campbell Brown's Jersey bull 'Tormentor.' He is the sire of twenty-three cows with butter records ranging from 14 lbs. to 23 lbs. 2½ oz. per week. Note his height at the croup or setting on of tail, the downward slope of the centre of the back, and the incurving of the thigh from the tail down, and the depth of barrel. Aside from these points, the photograph shows him to be spare, with clean shoulders, sharp withers, and ribs well defined.

"Fig. 2 is an illustration of 'Mercury,' the sire of twenty-one cows having butter records ranging from 14 lbs. to 19 lbs. 13 oz. per week. He is also full brother to 'Europa 176,' the dam of 'Eurotas,' that produced 778 lbs. of butter in a year, and whose grandson 'Young Pedro' and granddaughter 'Amite' produced 'Eurotisima,' that at the present time is the champion butter cow of the world, having given in 365 days the enormous amount of 945 lbs. 9 oz. of good marketable butter. It is well for the breeder and artist to carefully study the general outlines of animals having such wonderful butter heredity. We find in 'Mercury' the same back, hip, rump, and deep body as in 'Tormentor.' The outline is not taken from a photograph, but from a sketch, which may account for the lack of that degree of incurving of thigh that is seen on all great dairy sires.

"One of the best dairy forms is that of 'Toltec 6831' (Fig. 3), a son of 'Tormentor' and 'Oonan.' The latter is the only cow having six daughters in the standard list, and they average 16 lbs. 12 oz. per week. 'Toltec' has twelve daughters with records of 14 lbs., or over, among them 'Toltec's Fancy,' that made 27 lbs. 5½ oz.

"Of all great dairy sires, 'Stoke Pogis 3rd' stands at the head of the list, having twenty-seven daughters, with an average weekly butter record of over 20 lbs. I believe his picture was never taken, and in its stead is placed his youngest brother,



'Stoke Pogis 5th' (Fig. 4), that has already thirteen daughters, with an average weekly butter record of over 17 lbs., and bids fair to equal his elder brother. It will be noticed that 'Toltec' and 'Stoke Pogis 5th' are not as deep in body as the others, My observation leads me to believe that a deep body is not essential to a good dairy animal. I believe it is Mr. Webster who claimed that the comparatively small-barrelled cows are the ones that more readily respond to high feeding. I do not attempt to quote him, but am under the impression it is the idea he expressed.

"To show that the general type shown in the dairy sires holds od in females as well, an outline of the Rioter Jersey cow latilda 4th' (Fig. 5), that yielded over eight tons of milk in year, and from periodical tests for butter, exceeded 900 lbs. a ar. The development of spine, hip, and rump in this cow ems almost abnormal, yet it is in perfect harmony with her rformance. She does not waste any food product in padding it her thighs and shoulders.

"One of the greatest 'dairy mothers' is old 'Marjoram' 'ig. 6), the dam of 'Stoke Pogis 2nd, 3rd, 4th, and 5th.' She is a magnificent dairy form—thin neck, sharp withers, well-veloped spine, high rump, thin thigh, incurving until the leg nearly as small above the hock as it is below. A cow of is type is not likely to transmit beef qualities to her sons.

"To close this article without presenting Jersey 'Belle of cituate,' 'the ideal of perfection' (Fig. 7), would not be doing le article or our dairy queen justice. She has been defeated in nnual butter yield, but, taking food consumed into account, she ill stands unrivalled. Her record is 705 lbs. of butter in a ear; the largest ration of grain fed to her during the winter f this test was two quarts of bran. Her form is so good in very particular that I dare not mention a single point for fear f drawing attention from some others equally as good. All will say to the breeder, artist, judge, and reader generally is —look and learn."

I.—*Technical Education from the Agriculturist's Point of View.* By C. T. D. Acland.

r is impossible that any one who has followed the discussions nd harangues upon agricultural depression, of which for the st few months the papers have been full, should have failed to erceive with regret that, from a very large proportion of them, o practical result can be looked for, and this notwithstanding hat the English farmer is intensely practical and matter-of-fact ipon most subjects that touch him closely.

It may or it may not be true that the price of wheat touched ottom this year. The bottom is far below our power of ounding: and therefore, as far as we are concerned, it does not nuch matter, unless, indeed, the increase of value of wages hould turn out profitably to some of us.

Wheat is one of the cheapest and easiest foods for other nations to grow and transport to our markets, and it comes here

at less risk than any other food. It is also one of the raw materials of every industry, as it is a necessary of life. It is, therefore, in the opinion of many, the last thing that it is possible to tax upon importation.

Meat, again, can evidently be imported with ease and safety, though it is neither so easily nor so cheaply raised or transported as grain. Therefore the English farmer, whose produce can walk to market, will always have some advantage over the South American or Colonial producer of beef and mutton. The statistics of importation show that, with regard to the provision of fresh meat for the dense population of Great Britain, we are still a long way ahead.

With regard to dairy produce, however, matters stand on an entirely different footing. While the average percentage for five years of foreign meat supplied to the Metropolitan Cattle Market has fallen (between 1885 and 1890) from 51 per cent. to 49 per cent. in cattle, from 55 per cent. to 46 per cent. in sheep, and from 97 per cent. to 82 per cent. in pigs; in dairy produce, including margarine, the value of imports for the United Kingdom rose from 15,632,852*l.* to 18,656,223*l.*, and the quantities from 4,325,205 cwt. to 5,250,637 cwt. in the same time. Of course, in the Metropolitan Market, the imported meat would bear a higher proportion to the home produce than in any other.

Take another test for comparison. Of farinaceous food (rice and potatoes excepted) and of dead meat, the imports per head of population have increased in quantity (taking the averages 1881–85 and 1886–90), but have diminished in value, while in dairy produce they have increased both in quantity and in value. This seems to show that dairy produce has a greater power than meat of maintaining its price.* Here, at any rate, is ground for hope that improved skill and enterprise would find its reward. And when it is remembered that the total value of eggs, butter, and cheese imported in 1890 amounted to 22,085,029*l.* as against a total value for the imports of live and fresh meat of 18,696,866*l.*, the immense importance to the British farmer of the import of dairy produce becomes the more apparent.

It is absurd to expect that such broad results as the above are going to be affected by changes in the law. Small holdings, land tenure reform, the exclusive right in the tenant to ground

---

* In the last volume of 'Agricultural Returns' the average value per cwt. of imported fresh meat and dairy produce for 1881–85 and 1886–90 are thus stated:—

	Beef.	Mutton.	Butter.	Cheese.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
1881–85	2 14 2	2 18 5	5 1 10	2 12 9
1886–90	2 4 7	2 1 2	5 5 9	2 6 11

ime, further compensation or security for capital invested in nprovements, may possibly attract more capital to the cultiation of the soil. They may, or may not, be advisable, for arious reasons. But will they increase the interest received pon that capital? They may raise the price of land, but they ill not keep down rents or increase prices or profits.

The real questions will still remain, Is the capital invested n the production of the most remunerative articles expended n the cheapest way? Does the producer secure the profit? The experience of the last few years is not, so far, very encourging to those who would fain see the farmer give his attention o such points as these.

But, if such persons cannot build much hope upon their experience with the present occupiers of farms, there is still another direction in which the prospect may perhaps be a little brighter.

The recent encouragement given to Technical Education by means of a fund, the administration of which has been entrusted to Committees of County Councils, affords an opportunity of placing within the reach of the rising generation of farmers means of acquiring sound practical and theoretical instruction, which were never within the reach of their fathers. Practical, this instruction may well be called, for, although it is based upon recent investigation by scientific men of facts of everyday practice, and therefore is, in truth, scientific, it bears so closely upon various points of actual practice, that the application of the knowledge to be derived from such instruction should have a real and important practical result. Allusion need only be made to the recent investigation of the processes of cheese and butter-making, and of the operation of bacilli in the supply of nitrogen to the roots of leguminous plants underground, to illustrate to readers of this 'Journal' the truth of the foregoing remark.

It is indeed useless to attempt to forecast to what extent the Small Holdings Act is likely to be successful in fostering the resuscitation of a class of cultivators that has well nigh disappeared. But, in many parts of England, it is probably now becoming evident that the policy nicknamed "Three acres and a cow" is a policy by no means to be despised; and, in view of the statistics about the value of dairy produce, to which attention has already been drawn, it is surely worth while to endeavour, in whatever may be the best way, to encourage the promotion of skilful and economical dairy work in every direction among the agricultural community. The writer, during a tour in the North of England, was informed by some leading Cheshire farmers, with evident pleasure and pride, of the existence of one

village in that part of the country in which there were eighty or more occupiers of holdings answering very nearly to the description of three acres and a cow, or rather six acres and two cows. And the feeling of the larger farmers seemed to be that the presence of a large number of such occupiers was of great benefit to themselves and the neighbourhood, as affording a better supply upon which they could draw for assistance in the way of labour and horse hire. But it is clear enough that if this class of occupiers is to succeed in substituting home for foreign dairy produce, there will be, at any rate for some years, either ample scope for an army of dairy instructors, or else an ample supply of pupils for institutions of dairy instruction. And, in point of fact, such has been the recent experience of the British Dairy Farmers' Association, as well as of the Bath and West and Southern Counties Society's Dairy and Agricultural Education Committees. So much so that, as our readers are probably aware, efforts have been made, and repeated, to secure the establishment of a permanent central institution for instruction in dairy practice, as well as for experiment, illustration and investigation with regard to practical scientific problems bearing upon the production of milk for butter and cheese.

In Cheshire, where it might have been expected that farmers would think they know something about dairy work, there are two dairy schools which have been set on foot by the exertions of leading farmers and other persons, the maintenance of which is liberally assisted by the County Council. The support given by the Somerset County Council to the Dairy Schools of the Bath and West and Southern Counties Society has also been amply justified by its results.

Since the Society took up the subject in 1888, nearly 1400 students have attended courses of dairy instruction, and in the last three years nearly 200 have passed through courses of instruction in cheese-making.

There are, no doubt, several considerations which militate against permanent and stationary institutions for agricultural instruction, especially if such instruction is to be to any great extent practical. There are the two standing objections: (1) "What suits one farm don't suit another," and (2) "Farming cannot be *taught*, it can only be *learnt*." Besides these, there are difficulties about distances to be travelled by pupils, expenses of permanent staff, efficient conduct of experiments, labour, superintendence, &c. These are sufficiently numerous and important to render extremely hazardous, if not actually inexpedient, any attempt to found a college for the sons of farmers, or any kindred institution for the special purpose of teaching agriculture, to say nothing of the extreme inexpe-

ency of isolating future farmers in their boyhood and depriving em of a good general education. Such objections, however, not tell quite so strongly against the wisdom of an attempt provide a special institution, of a more or less permanent aracter, for the scientific investigation and illustration of rious facts in dairy practice, and for giving special instruc- on in all branches of dairying to those who have finished their neral education and are about to enter into the practical work life.

The Agricultural Department has made public the opinion at such an institution would be of great use. It may not be cessary to continue it permanently. But present circum- ances seem to point towards the expediency of endeavouring start and maintain such an institution for, say, seven or ten ears.

During that time, by means of grants from county councils nd scholarships to provide for travelling expenses, board and dging, and fees, many persons might be enabled to qualify iemselves to become efficient instructors. No one who is cquainted with the work of spreading technical instruction in ural districts can be unaware of the great difficulty of obtaining nstructors who have both the gift of teaching and the requisite cquaintance with the habits and circumstances of various istricts, besides the fundamental requisite of a scientific insight nto the principles of their subject. Such persons are rare, and re often unaware of their own capacities and powers. Rarer till are they who are aware of their own deficiencies. It s only by affording the opportunity for many to make the ttempt that those few can be found. But they must be ound if we are to succeed in putting our improvement in dairy ractice on a sound and permanent footing. Farmers and their vives have too often an instinctive horror of science, and a rofound distrust of those who base upon scientific data any dvice they may offer. It is only by sending among them irst-rate practitioners acquainted with every detail of practice, very difficulty, every dodge and contrivance, and also thoroughly quipped with a scientific knowledge of the facts and laws to which practice must conform, in order to succeed, that the general practice of the country can really be improved. If the eacher can show that he or she can succeed in actual manipu- ation as well as, or better than, the pupils, the advice *may* be taken, and the suggested improvement *may* possibly be thought over. If, in addition to that power, the teacher is able to show the coincidence of sound practice with a law of nature or a fact in science, and the origin of failure or waste in the neglect of such law or the ignoring of such fact, then the pupils will

begin to desire further instruction and the progress made v be permanent.

Much good, no doubt, has already been achieved by t itinerant dairy schools. But we want more of them, we wa them soon, and we shall want them for some time; and proportion to their success a demand will grow up for the But after a time that demand will be met and will th diminish. Therefore, probably the wisest course in regard the establishment of any permanent central institution for da instruction and investigation will be, not to contemplate co plete permanence, but to provide now for, say, seven years, w power to cease or continue after that time.

With reference to technical instruction for agriculturists other branches of agriculture, the experience of County Coun Committees (except in Yorkshire, where the lecturers—fo specially skilled persons—secure audiences at lectures of fr thirty to forty throughout their courses) seems to show, the most part, that it is for the rising generation only th such instruction can usefully be provided.

The question how it can best be so provided is one of gr importance, and on this it may be worth while to suggest t or three points worthy of consideration.

The first question, and perhaps the most important, is, Wh is open to us? In other words, What is it useful and practi to attempt?

A second question, of almost equal importance, is—What is that is really needed? Where is the gap in the present edu tion of the farmer that has to be supplied? What opportun does the provision for technical education afford him which did not previously enjoy?

The third question, which ranks with these two, is, What the best way in which it can be done? and this includes t subordinate inquiries:

(a.) What means exist which we can adapt to a new purpo

(b.) To what extent is it necessary to make entirely n provision.

In reply to the first question, some persons are inclined urge that we ought to take in hand the intending farmer, a train him in all branches of his business, under the impress that by so doing we can turn out a man thoroughly equip for the very hard struggle that lies before him. Others w say that it is no use to attempt anything of the kind, inasmu as the English farmer knows his own business better than a one else, and, by cramming him with scientific theories, will turn a practical man into a visionary experimentalist. truth lies probably between these two extremes.

There is no doubt that the management of a farm for profit can only be learnt by the actual acquisition of experience, just as in any other art or trade. On the other hand, there is also no doubt that the mere experience to be gained on an ordinary farm will not bring the young man into contact with any appreciable portion of that which has now become matter of certainty, actually known and tested by experiment, founded upon a natural law, and, hence, is of real practical importance in the economical production of food from the soil, in avoiding waste, and in minimising risk.

Painting will not teach perspective, nor playing musical instruments the principles of harmony. Our aim, then, ought to be, not to teach practical farming, but so to prepare the mind of the young man who intends to take to farming, that he may derive the utmost possible advantage in his practice from what scientific men have ascertained by their study. And we have to bear in mind that he can only devote about three years more to the process of education than the son of the labourer. That is to say, he has to commence the practical part of the training by the time he is sixteen or seventeen. The question then arises, what can be done during those three years so as to use them to the utmost advantage? What can we add to what has already been offered to him in the secondary schools to which he has access?

The object before us is not to fill his mind with a collection or rather a selection of scientific facts, but to open and prepare his mind for the reception of the results of observation, his own future observation in his practice, and the recorded observation of men engaged in scientific investigation.

Probably one of the first and most fundamental steps is to enable him to realise the actual character of a law of nature, its depth and width, the precision and uniformity of its action, and its definiteness. Then also it will be essential that he should understand what is meant by the scientific terms most commonly in use, and the principles of classification adopted in such sciences as botany, chemistry, mineralogy, and zoology, but especially the elementary principles of biology—or the study of life and the functions of living matter. The elementary principles of applied mechanics and the usefulness of geometry and algebra ought to be impressed upon his mind.

Now it can hardly be maintained that, till at any rate within the last very few years, the schools open to the sons of farmers have afforded them opportunities for this sort of preparation. But nothing short of such preparation as this will enable them to read with intelligence any appreciable proportion of what is unceasingly being presented in journals, handbooks and discus-

sions on agricultural topics. It is often complained that "farm do not read." But there is a very good reason for it. Many them have not been so trained as to be able to understand read with intelligence, the greater part of what is written u their subject by men who have information to give them. I no uncommon thing to find "crackjaw" chemical phraseol in the first half dozen pages of books written for farmers. A in addition to this discouragement, there are but few men re trained in science who have sufficient acquaintance with mental habit of those who spend the whole of their lives rural and agricultural affairs to be able to present the valua information which they have to convey in such a form as tc attractive to agricultural readers.

It is partly for this reason that the practical farmer seems to of all men, the most unwilling to deviate from the method his predecessors. And it is probably in this direction that function of technical instructors will be found to lie, by open the minds of the young men to what is going on aro them. Some parts of the country are not badly equipped w secondary schools of such a kind as to be within the reac farmers' sons. But, no doubt, there is much yet to be provi and much improvement can be made in the present provis It is very desirable that Parliament should show the s interest in schools of that grade as has already been frui with regard to the Universities, the larger public schools, the elementary public schools of the country. But, pend such action by the legislature, there is certainly much that be done for the agricultural lads in such schools.

The institutions of Cirencester and Downton, and some ot of a similar kind, have, on account of circumstances which n not now be referred to in detail, adopted a different standard, a as a matter of fact, they are not now used by farmers of most numerous class. Nor can it be admitted that the cou schools, such as those of Devon and Norfolk, even if they w more numerous than they are, would exactly provide wha wanted, though, in some respects, they more nearly meet farmers' needs than most kindred institutions.

Then again there are special institutions, such as Aspatria and Hollesley Bay Schools, which do excellent w but still are not exactly what is needed for the lar number of agricultural lads who intend to follow their fath business.

It seems that what is really wanted is a class of second schools which shall combine two characteristics. Their sys must be such as shall provide a good general education lads who, commencing at ten years of age, must at seventee

en leave school and begin to work. It is as far from ole to have schools confined to farmers' sons and lads who become farmers, as it would be to have schools confined sons of clergy, and train them to be clergymen, or, in fact, ate from their youth upwards the future members of any sion.

s just as true that men will be better farmers as that they be better clergymen, soldiers, lawyers, doctors (anything t sailors), for having received, during as long a period as le, a wide general education among lads with other associ- and other habits and ideas. But, while this fundamental ple can never without detriment be ignored, it does not seem uch to hope that along with the general education which d be maintained to the very end of the school life, there be, especially in schools situate in the country districts, opportunities for enabling the teachers of science, who are ndispensable in every successful school, to illustrate their ific teaching by object lessons upon subjects drawn from ary agricultural life. Analysis, solution, precipitation, ary attraction, and numberless other such processes, can ustrated by common things, and the powers of observation lads can thus be stimulated, and their generalizations and tions checked and guided, in such a manner as to have nportant influence on their use of those powers in after

ey can, at least, be taught to value the conclusions arrived at curate scientific investigation, and—what is more important *to value* statements of opinion based upon insufficient data; may learn to suspend their judgment, they may be trained curate observation. They may acquire the habit of distin- ing between rapid and hasty generalizations, and the tenta- uggestions made by accurate minded men. And above all, may learn the truth so well conveyed in the following —

"We ponder, question, doubt, and pray
The deep to answer yea or nay.
Yet what doth the engirdling wave,
The undivulging yield us, save
Aspersion of bewildering spray?
We do but dally on the beach,
Writing our little thoughts full large,
While ocean, with imperious speech,
Derides us trifling on the marge.
Nay, we are children who all day
Beside the unknown waters play,
And dig with small toy spade the sand,
Thinking our trenches wondrous deep,
Till twilight falls, and hand in hand
Nurse takes us home, well tired, to sleep."

In order to arrive at the goal sketched out in the foregoing suggestions, we have to address ourselves to the last of the three points mentioned as part of the general question: What means exist which we can adapt to our purpose, and what entirely new provision is required?

It is then maintained that, in a very large proportion of the existing secondary or middle schools, means of providing the fundamental requisite, a good general education, may be found. though, undoubtedly, many of them need to be improved—but not off the face of the earth—and stimulated by means of scholarships, exhibitions, examinations, and inspection. This, to some extent, has already been achieved by the Oxford and Cambridge Local Examinations, and by the Royal Agricultural Society's Examinations. But more remains to be done, and it may fairly be hoped that Parliament will entrust the Education Committees of County Councils with powers for this purpose.

In certain cases, in order to assist the science teacher to give, for the sake of some of his pupils, a specially agricultural turn to parts of his teaching, it may be wise to set aside some portions of the Technical Education Funds, now in the hands of County Councils, for providing small plots of ground for the purpose of botanical and chemical illustration. For instance, it would be of great use to be able to grow all the various grasses, to note their dates of flowering, seeding, &c.; to grow various cropping plants under similar and various conditions, and note the varying results. The botanical or chemical teaching so rendered possible would, as mental discipline, be of value to all scholars, but it would be of definite practical value and of great interest to lads who look to farming as their career.

Meanwhile, with the special object of stimulating and assisting the provision of agricultural instruction and illustrations, it would probably be wise to devote some part of the fund mentioned to the payment of specially qualified teachers. These might be itinerant, teaching classes and superintending illustrative or experimental plots at three or four different schools simultaneously, and there would seem to be no obvious reason why other subjects might not be dealt with in the same way. Simple and practical lessons upon applied mechanics, hydrostatics, and heat, would be of very great benefit to agricultural lads, as well as others. Many occasions must occur to every one when a correct (if not a full and accurate) apprehension of the elements of those sciences might avail to save waste of labour and material, and prevent mistakes, which cost money to correct. It is true that first-rate teachers of such subjects require, and can obtain, high rates of remuneration. But, with the aid of the

Technical Instruction Fund, and with a reasonable amount of organization and combination, the secondary or middle schools in a county should be able to provide such instruction as it has been here argued is much needed.

Something, no doubt, may be hoped from the institution of continuation schools and evening classes, conducted by elementary schoolmasters who have South Kensington certificates on half-a-dozen sciences. But the farmer ought to insist upon more for his lad than this, and it should be the pride of each school to supply such teaching as shall really equip those who are to farm in the twentieth century for a harder struggle even than their fathers have had to sustain during the rapid growth of competition which has been one of the main characteristics of the nineteenth.

NOTE.—The following figures, quoted by Mr. Acland in a speech recently delivered at Dulverton, are worth consideration in connection with the subject matter of this paper.—ED.

IMPORTATIONS INTO THE UNITED KINGDOM FROM ABROAD.

Year.	Population.	Fresh Meat. Cwts.	Value in round Numbers.	Lbs. per Head of Population.	Approximate Price per Cwt.
			£		£
1870	31,250,000	55,800	167,400	0·2	3
1890	38,250,000	3,500,000	7,500,000	10·4	2

Year.	Population.	Butter. Cwts.	Value in round Numbers.	Lbs. per Head of Population.	Value per Head of Population.	Approximate Price per Cwt.
			£		s. d.	£ s. d.
1870	31,250,000	1,172,000	5,600,000	4·2	4 4	5 9 0
1890	38,250,000	2,000,000	10,500,000	9·1	7 2	5 5 0

Year.	Population.	Eggs. Number.	No. per Head of Population.	Approximate Price per 100.	Grain. Value.
				s. d.	£
1870 ..	31,250,000	437,500,000	14	7 6	..
1890 ..	38,250,000	1,224,000,000	32	6 0	20,500,000

The kind of instruction which has been suggested above now being given successfully in one or two institutions, a possibly more, and there is ground for hope that the need for as it becomes appreciated, may produce a better supply. I teachers have been difficult to find; the demand has b hitherto faltering and uncertain. In point of fact, the farm have not been roused on the subject. But the influence of University Local Examinations, in improving and testing, some extent, the work of the secondary schools, is slowly l surely producing farmers more inclined and able to read and listen. The recent grant, to which allusion has been made, l added a stimulus, and there is now reason to believe that t demand will increase in a geometrical ratio. May this be s Nothing would offer so hopeful a prospect for the immense a important industry which unites so many and so various s tions of the community, and which, in one sense, is so vital to prosperity.

VII.—*Age-Limits to the Profit of Dairy Stock.* By JOHN F. HA of Sharcombe, Wells.

ENGLISH AND AMERICAN DAIRY PRACTICE.

THE reader of Willard's "Practical Dairy Farmer" (New Yo 1871), will probably pause when he comes across the followi passage on page 169:—"The quality of cows' milk is affect by the age of the animal as well as by the distance from t time of calving. Now, as to the milk of aged cows, the gene impression in this country (U.S. America) is, that the milk old cows is quite as good, or even better, than that of you cows. Hence the almost universal practice of our dairymen to retain good milkers on the farm, and if no accident occurs, account of which the milk fails, they are kept in the da until quite worn out with age, and then are turned off—l little better than mere skeletons of hides and bones—at fr six to ten dollars per head.

"In England I found a very different practice prevaili When milch cows have attained the age of from six to eig years, they are put in condition for the shambles and sold. good profit is thus realized upon the animal for meat, irrespecti of what it may have made in the dairy. *They hold that milk of old cows is of inferior quality to that of young co and chemical analysis, it seems, confirms this opinion.* Aga as old cows consume more food than young cows, and a

therefore more expensive to feed, nothing appears so unprofitable as to keep cows until they grow old. Voelcker affirms that, generally speaking, after the fourth or fifth calf the milk becomes poorer."

VOELCKER ON AGE AS AFFECTING MILK YIELD.

If the reader now turns to the "Lectures on Milk," published by the late Dr. Voelcker in the Royal Agricultural Society's Journal, Vol. xxiii., p. 413, he will find the following passage confirming Mr. Willard's statement:—

"The quality of cows' milk is affected by the age of the animal as well as by the distance from the time of calving. An old cow does not yield such good milk, nor as much milk, as a young cow. I have seen an analysis of a very poor milk, analysed in Holland by Dr. Baumbaur, which came from a cow which had had ten calves. Nothing appears so unprofitable as to keep cows for so long a period. Generally speaking, after the fourth or fifth calf the milk becomes poorer."

TWO VIEWS OF DAIRYING.

These passages reveal a striking difference of opinion upon an important practical question in dairying. On the one hand, we have a body of farmers contending that the milk of old cows is quite as good as that of young ones; on the other, we have another body maintaining precisely the opposite view. One set keeps its cows in the dairy till they are worn out with age, the other despatches them to the butchers whilst comparatively young. Again, one relies solely upon the dairy produce for his profit, the other regards the carcase of his cow as an indispensable part of that profit.

QUERIES TO BE ANSWERED.

Both contentions cannot be right. An old cow either gives less milk, or she does not: this milk is either poorer in quality, or it is not. At some period in a cow's life she ceases to give a sufficient profit in the dairy, and is better passed on to the butcher. Is this before she attains the age of six years, or after it? These are simply questions of fact which must be determined before we can pronounce in favour of either of the two systems of dairy farming. Fortunately they are questions which need no longer be left to conjecture nor to haphazard conclusions. Thirty years have elapsed since Dr. Voelcker's Lectures were published, and during the last ten of these years the researches

of science, and the records of practice, have resulted in the accumulation of a body of evidence, bearing on the points in dispute and sufficient for the solution of our doubts.

Before proceeding to examine this evidence, let us, however, in justice to the British farmer, briefly inquire how far we may accept our American author's statement in regard to his practice. The principal information upon this point is to be gleaned from back numbers of the Agricultural Societies' Journals. From this source we submit the following extracts:—

ENGLISH EVIDENCE UPON PRACTICE PREVAILING, 1795–1876.

In the Royal Agricultural Society's Prize Essay on "Farming in Lancashire" (1849), the author, writing of a herd of Long-horned cattle kept for dairy purposes by a tenant of the Duke of Hamilton, says, that the owner prefers them on account of their hardihood and of the quality of their milk. He also says that they last longer than Shorthorns, and will produce calves up to fourteen or sixteen years of age.

In the same Society's Prize Essay on "Farming in Dorset" (1854), it is stated that cows brought into the dairy at three years old are kept there, if all go right, for seven or eight years (say till ten or eleven years old), and those of the very best quality longer, for breeding purposes.

Again, in the Prize Essay on "Farming in the Channel Islands" (1859), it is said of the Jersey cow, that she is in her prime at six years old, and continues good till ten years old: many are kept longer, but then they begin to fall off.

In 1853, M. Le Beir, writing of the Guernsey cow, concludes thus: "It is not widely known that a good milker is often kept from fifteen to eighteen years, and on that account must be a desirable acquisition to the dairyman."

In an article on "Longhorns" (1876), the author remarks, that having spoken of them as milkers and feeders, there is yet another quality to which he must allude, namely, their great longevity—"no slight advantage to a poor cow-keeper." So remarkable is this longevity, that in counties where this breed is kept, the expression "as old as a Longhorn cow" has become a proverb.

Arthur Young, in his "Six Weeks' Tour in the Southern Counties" (London, 1772), speaks of a dairy near Bury, in Suffolk, managed by a farmer's wife who for thirty years was considered an excellent dairy woman. Her statement to the author was, "Cows are not at their prime till five or six years old; they last good till fourteen or fifteen years old."

In his official survey of the Agriculture of Somerset, drawn

up for the Board of Agriculture in 1795, Mr. Billingsley writes: "The Somersetshire dairymen generally keep their good cows till they are ten or twelve years old. . . . A north country breeder would laugh at the idea of keeping a cow so long; he would declare that at six, or at furthest at seven years, she ought to be in possession of the butcher. *But coolly and calmly ask a practical cow-keeper at what period of life a cow makes most goods, and he will tell you between the age of six and twelve years old.* I have known cows continue good milkers till past their twentieth year."

The cows kept for dairy purposes in Somersetshire when Mr. Billingsley wrote, were, as he tells us, mostly of the Shorthorn breed, and "in point of carcase were very deficient"; but then, says this author, "very little of the dairyman's profit is expected from the sale of the carcase." And with regard to the merits of Shorthorns *v.* Longhorns (a controversy which appears at that date to have been raging hotly), he dismisses it with the characteristic remark, "So long as his cows are well kept and *yield plenty of rich productive milk,* what does it matter whether they have long horns, short horns, or no horns at all?"

Other extracts might be cited, but these will suffice to show that amongst British dairymen the practice of early and indiscriminate slaughter was not universal: that in some counties, as well as in the Channel Islands, the longevity of certain dairy breeds was held to be a point in their favour, and that here and there districts could be named where a good cow was retained in the dairy till she was "worn out with age."

POINTS TO BE INVESTIGATED.

Let us now inquire what evidence, of a practical or of a scientific kind, can be adduced in support of the claims of the old dairy cow. The points we wish to ascertain are these two: (1) the average milk yield during the successive years in the life of a cow; (2) the average richness of this yield.

With regard to the first point, namely, the quantity of milk yielded in successive years, an authoritative conclusion could be at once obtained if we were in a position to compare a number of independent and trustworthy milk records, extending over a series of years. Unfortunately few farmers register the milk yield of their cows; still fewer publish them, and amongst these few there is only a minority who supply all the data required. Even in such valuable records as those of the late Mr. Tisdall, and of Mr. Edwards, of St. Albans, published by the British Dairy Farmers' Association, no information is given respecting the age of individual cows.

QUANTITY OF MILK YIELD PER YEAR AND PER DAY.

The two subjoined records relate to well-known herds that of the Gloucestershire Shorthorn dairy herd, owne Mr. Harrison, of Frowcester Court; (2) that of the Jersey herd, owned by Lord Braybrooke at Audley End. In thes yearly milk yields are classified according to age.

TABLE I.

AVERAGE MILK YIELDS PER YEAR.	Shorthorns.	Je
	galls.	g
Between 2 to 3 years old, average milk yield	317	
" 3 " 4 " " "	472	
" 4 " 5 " " "	535	
" 5 " 6 " " "	616	
" 6 " 7 " " "	665	
" 7 " 8 " " "	635	
" 8 " 9 " " "	708	
Over 9 " " "	651	

The information furnished in this table, may be supplem from the records of the public milking trials, which have conducted during many successive years by the British Farmers' Association. These annual trials are record detail in the Journal of that Society. Our summary ex from Oct. 1887 to Oct. 1892 inclusive.

TABLE II.

AVERAGE MILK YIELDS PER DAY.		Shorthorns.	Je
		quarts.	q
Average time after calving, 7 to 12 weeks	Between 2 to 3 years old	14	
	" 3 " 4 "	15	
	" 4 " 5 "	20	
	" 5 " 6 "	17	
	" 6 " 7 "	21	
	" 7 " 8 "	18	
	" 8 " 9 "	20	
	Over 9 "	18	

Careful inspection of these tables does not reveal any obvious tendency on the part of the cow to diminish her as age creeps upon her. On the contrary, Table II. presen record of a fairly even and continuous flow maintained th all the years intervening between the beginning of the and the end of the tenth year of her life. But let us pro

step further in the analysis of these milking trials, by dividing the animals into two groups, consisting of those under six years old and those above it.

UNDER 6 YEARS OLD.

32 young Shorthorns (averaging 52 days in milk) yield 16 quarts daily.
62 „ Jerseys („ 67 „) „ 10 „

OVER 6 YEARS OLD.

26 old Shorthorns (averaging 68 days in milk) yield 20 quarts daily.
28 „ Jerseys („ 86 „) „ 12 „

These records, therefore, furnish this fact for our consideration: that out of 148 cows sent in to be tested, the average daily milk yield of the 54 animals which had passed the age of six years, exceeded the average of those which had not reached that age, by a quantity varying from 20 to 25 per cent.

QUALITY OF MILK YIELDS.

We have next to consider what is the quality of this milk. Is it poorer in the case of old cows? The quantity of fat present in milk, which is the secret of its richness, is ascertained by chemical analysis: the amount of that fat which is recoverable in the form of butter is best learned from the churn. We propose to collect evidence from both sources.

Jersey cattle have been publicly tested by the churn for the past six years. During this period 213 cows of an age varying from two to eleven years, have yielded the following results:—

TABLE III.

Jerseys.	No. tested.	Butter ratio of Milk.
Between 2 to 3 years	20	1 lb. Butter from 16 pints Milk.
„ 3 „ 4 „	26	1 „ „ 16 „
„ 4 „ 5 „	42	1 „ „ 15 „
„ 5 „ 6 „	36	1 „ „ 16 „
„ 6 „ 7 „	34	1 „ „ 15 „
„ 7 „ 8 „	26	1 „ „ 14 „
„ 8 „ 9 „	15	1 „ „ 15 „
„ 9 „ 10 „	7	1 „ „ 15 „
„ 10 „ 11 „	7	1 „ „ 15 „

Chemical Analysis.—Reverting to the Milking Trials, the following table shows the actual amount of fat which was found to be present in the milk of Shorthorns and Jersey cattle, during the successive years of life between two and eleven years. The average period which had elapsed since calving, varied in the different classes between seven and twelve weeks.

TABLE IV.

Age.	Shorthorns.*	Jerseys.*
Between 2 to 3 years	11 ounces butter fat	10 ounces butter fat
„ 3 „ 4 „	12 „ „	11 „ „
„ 4 „ 5 „	12 „ „	12 „ „
„ 5 „ 6 „	13½ „ „	12½ „ „
„ 6 „ 7 „	16 „ „	14½ „ „
„ 7 „ 8 „	13 „ „	13¾ „ „
„ 8 „ 9 „	14¼ „ „	12 „ „
„ 9 „ 10 „	.. ..	11 „ „
„ 10 „ 11 „	16 „ „	14½ „ „
11 and over	16 „ „	.. ..

* The average live weight of the Shorthorns at these trials is about 1360 lbs.; that of the Jerseys about 840 lbs.

Just as we remarked in regard to the *quantity* of milk yielded, so we may repeat in respect of its *quality*, that neither Table III. nor Table IV. furnish the evidence of any marked deterioration with advancing age. It is true that, in both cases, the animals experimented upon represent the picked milkers selected from the best dairy herds. It is also true that, in both cases, these animals rapidly decline in number after the ninth year of age. Consequently, too much reliance must not be placed upon the results recorded in the three last lines of the tables, until further facts have been collected to verify them. It is sufficient for our purpose to show what results have been obtained from such aged cows as have been hitherto subjected to proof.

Let us now divide the cows into groups as before, and mark the relative quantities of butter fat yielded from the milk of each group.

UNDER 6 YEARS OLD.

32 young Shorthorns yielded an average of 12½ ozs. butter fat per day.
62 „ Jerseys „ „ 11 „ „ „

OVER 6 YEARS OLD.

26 old Shorthorns yielded an average of 15 ozs. butter fat per day.
28 „ Jerseys „ „ 13¼ „ „

CONCLUSIONS BASED ON FOREGOING EVIDENCE.

In so far as the trials, both of the English Jersey Society and of the Dairy Farmers' Association are concerned, they tend to establish the conclusion that old cows do *not* give less milk, neither do they give a milk that is poorer in quality than that of young ones. On the contrary, the old cows, both of the Shorthorn and Jersey breeds, notwithstanding that they were some three weeks staler in milk than the young ones, yielded

rom 20 to 25 per cent. more milk and also from 20 to 25 per ent. more butter fat in that milk.

The reader who has followed the course of our argument, and ias examined the foregoing tables, will scarcely be disposed to lispute the conclusion that there is no justification for the weeping condemnation that has been passed upon the old dairy ow. If, on the one hand, it be true that some old cows are nprofitable in the dairy, on the other, it is equally true that *he largest and richest milkers are to be found amongst the older tock.* We must therefore declare in favour of those farmers who, elying mainly upon their milk produce for their profit, retain he best milkers as long as possible upon the farm, and decline o adopt an indiscriminate rule of slaughter for all which have passed a certain age-standard.

PRACTICAL CONSEQUENCES FOLLOWING THESE CONCLUSIONS.

But what practical consequences follow this conclusion? Our reply will depend in part upon the nature of the dairyman's business. If he be a town milkman—residing in a populous district where the rental of land is relatively very high—there may be, in his case, exceptional circumstances which justify his practice of buying freshly calved cows every season, milking them as long as the milk holds out, and then, without calving them afresh, fattening them for the butcher. At any rate we have the undoubted practical authority of Mr. G. T. Barham (*vide* B. D. F. A. Journal, vol. ii., part 1, p. 54), for this view of the case. We therefore dismiss the town milkman from our consideration, merely remarking that, if he be a clever man and a good judge of milch cattle, selecting only prime animals for his purpose, he will probably slaughter as many good cows in a twelvemonth as t will take the united labour of half-a-dozen careful breeders to replace. Our interest lies with those farmers whose business consists in the production either of milk alone, or of cheese and winter milk, or of butter, and who rear a certain number of cow-calves for the sake of maintaining an efficient herd. The profit of these branches of dairying rests primarily upon the milk yield of the herd. If this yield is deficient in quantity or in quality, the business is handicapped from its outset. If, on the other hand, the yield be abundant and rich, it is started under favourable conditions. But a full and rich milk flow cannot be obtained by the farmer whose practice it is to kill his cows at six to seven years old, and to replace them with animals bearing their first or second calf.

Such a system actually inflicts a two-fold injury upon the dairy; first, by the withdrawal from the herd of those cows

yielding milk *in excess* of the average quantity and quality; second, by the introduction in their place of cows yielding *less* than the average. The loss of a good old cow from his herd should be regarded by the farmer much as the loss of one of his party is regarded by the leader of the House of Commons—it is a vote subtracted from the right side and added to the wrong, counting for two upon a division!

Can we estimate the effect upon the gross returns for milk in a dairy conducted upon either line of policy? Approximately we think we can; at any rate, the attempt is worth making if it only roughly illustrates the money consequences involved in this question of dairy practice.

EXAMPLE ILLUSTRATING THE EFFECT OF AGE UPON THE GROSS RETURNS FOR MILK.

Let us suppose the case of adjoining farms, in which the milking cows are equally well selected, equally well pastured and wintered. As our guide to the milk produce of such cows, we will take the figures relating to the Shorthorns in Table I., which are the average quantities actually realised in a series of years in Mr. Harrison's herd. Each farm maintains, say, twenty-five milking cows. But it is Farmer A.'s practice to retain his cows in the dairy until about seven years old, and then to sell them to the butcher, bringing in freshly-calved heifers in their place. Consequently the age of his herd ranges between two and seven years, *and averages four and a half years per cow.* The milk yield is 504 gallons per cow per annum, or 12,600 gallons for the herd.

Farmer B. has also twenty-five cows, but as it has been his practice to prolong the life of his best milkers, the age of his cows, which has constantly tended to increase, now reaches *an average of seven years.* The milk yield per cow is 650 gallons, or 16,250 gallons for the whole herd.

On this supposition B. obtains 3650 gallons more milk per annum from his twenty-five cows than does his neighbour A., which excess, estimated at 6*d.* per gallon, amounts to 91*l.* 5*s.* per annum. In three years this would amount to a sum of over 270*l.*, which should do more than compensate B. for any loss in the carcase value of his stock entailed by his policy of protracting their life from seven to ten years.

But the increase in milk yield is not the only source of profit to the farmer; there has also to be considered the increased richness of the milk drawn from the older herd. According to the results given in Table IV. this should prove to the farmer a source of considerable additional gain.

There is yet another aspect of Farmer B.'s method of farming, which is likely, in course of time, to increase his profits as compared with those of his neighbour. His success in attaining a remunerative yield of milk will tend to fix his attention on improving the dairy properties of his cattle. He will no longer, like his neighbour, halt between two opinions, inclining at one time to the claims of beef, and at another to those of rich milk; he will leave the development of beef properties, with its conflicting demand for early maturity, to the producer of graziers' and butchers' stock. In his breeding operations he will select such dams from his herd as have proved during successive years their ability to produce rich milk, and plenty of it: he will revert to the custom of his ancestors who, as we have shown, kept good old cows for breeding even after their milking powers showed signs of decay: he will mate these cows with bulls descended from like good milch cows: finally he will preserve the cow calves for the enrichment of his own herd. Thus, in proportion to his skill and perseverance, he will reap his reward, as many have done before him, in the creation of a herd of deep and continuous and rich milkers.

On these points we call attention to the views expressed by two most recent practical authorities in connection with British dairying; viz., the late Mr. E. C. Tisdall and Mr. G. T. Barham.

Mr. Barham, writing with regard to butter cows, says: "Perfection in animal structure, such as will produce the highest results in converting food into beef, is antagonistic to the best results in converting food into milk, cream and butter. Hence, the more perfect the beef form, the less the milk. This being the case, how does the attempted improvement (in the direction of the beef type) affect the farmer who keeps a herd of Guernseys, makes their milk into butter, and calves the cows down for from three to eight years. If, after a few generations, he develops their beef properties so as to have them ready for the butcher should an accident occur, or as soon as dry, *he must do so at the expense of the butter, which he will gradually reduce the more perfectly he approaches the beef type.* If the yield of butter be reduced, say, only one or two pounds per week, and this be spread over several years, the loss in butter will be greater than any increased amount that can be obtained for the beef. *The sum likely to be obtained in the sale of a cow seems unfortunately to impress itself more on the farmer's mind than the additional yield of butter spread* over several years."

MILK YIELD RAISED FROM 426 TO 868 GALLONS PER ANNUM.

Our quotation from Mr. Tisdall relates his personal exp rience as to the effect of careful breeding in developing the milki properties of his herd. Mr. Tisdall writes: "Every cow's mi is regularly measured and recorded. The average amount milk given daily by a number of ordinary bought-in first cla heifers, taken at various periods from 1847 to 1857, was near 8 quarts, *or* 426 *gallons annually*, and these kept in milk months. At a later period sixteen home-bred heifers yielded average of 7½ quarts, equal to 600 *gallons yearly*. These ke in milk over 11 months. Last year, 1876, ten heifers, bred a Shorthorn bull from good dairy cows, gave 9½ quarts daily f twelve months, *or* 868 *gallons per annum*."

STERILITY.

One other point remains to be considered, and that is t question of barren cows. If Mr. Barham's statement, that t breeding for beef tends to the injury of the milking properti be accepted as true, the converse of that statement is also a suredly no less true. In breeding to develop milking properti the farmer will find that he is gradually receding from the be type. What then will he do with such cows as through accide of one sort or another turn out barren? We do not deny th breeding for milk will probably lead to a loss on the carca value of a herd; but, supposing it does, the loss on the sale beef must be set off against the profit on the increased m yield, which we have already shown reason for thinking shou in a well-managed herd, do more than compensate for this lo Moreover, it must not be forgotten, that sterility, though it an incident of common occurrence amongst beefy cattle, not nearly so common in cases where milking propert are well developed. Hence the farmer who breeds for m leaves behind him a portion at least of the difficulties arisi from barrenness. Mr. Joseph Darby, writing on pedigree cat (B. and W. of E. Journal, vol. xv., p. 107), remarks: "Shre observers have always discovered that *fertility and deep milk invariably go together*, and no surer way of injuring the form could be devised than sacrificing the latter." Mr. Armstro manager to Sir Hussey Vivian, writes: "*I have found through my experience deep-milking cows to be the most fertile.*"

SUGGESTIONS TO THE OWNERS OF DAIRY STOCK.

The advice, founded upon the foregoing inquiry, which shall venture in conclusion to offer to dairy farmers general is:—

(1.) To register once a week the produce in milk of each cow in their herd.

(2.) Not to part lightly with their old cows.

(3.) To retain for breeding purposes the good old milkers, even should their milking powers begin to decline.

(4.) To replenish their herd with heifers of their own breeding.

(5.) To select bulls descended from dams of approved milking quality.

And, if the farmers are concerned with those branches of dairying which produce milk for cheese and, more especially, for butter-making:

(6.) To give attention to the quality of the milk as well as to its abundant quantity.

The amount of fat present in milk, subject to certain physical conditions, is known to be a test of excellence in the butter cow. The presence of the same fat, under varying physical conditions, has come to be recognised as a test of merit in the cheese cow. Neither the cheese-maker nor the butter-maker can afford to ignore conditions so essential to success in his industry.

VIII.—*An Agricultural Tour in Scandinavia.* By Prof. JAMES LONG, of Romsey, Hants.

DENMARK.

THE interest of the writer in Denmark, and the sister countries of Sweden and Norway, arose entirely out of the attractive programme of the National Show in Jutland of the Royal Agricultural Society of Denmark in the year 1883. This induced him to visit Denmark, and to see and learn for himself something of that system which had enabled the Danish farmer to take his place at the head of the butter markets of our country. At this great gathering,—following closely upon a similar exhibition, the German International at Hamburg,—the first of the "battles of the Separators" occurred; and by the help of some of the experts engaged, we were enabled to learn something of the construction of the Laval and Danish machines, as well as of the Lefeldt and Heinrich Petersen, both of which latter, though meritorious, are now left behind in the race. The trials were witnessed from day to day, and led to the conclusion that neither machine would entirely meet the requirements of the English market, but that a hand machine would be necessary; this belief was forcibly urged, but only to meet with the

reply that the thing was not possible. More recently, however, some of the very men to whom the remark was made have admitted its truth, and that they ought to have recognised it earlier.

The national breeds of cattle at the 1883 Exhibition, the Jydsk and Angeler, were small, and it was especially remarkable that their size was not compensated for by either a large yield or high quality of milk. Our impression of 1883, that the Jydsk was ugly, and the Angeler neat and characteristic, has been since confirmed, and the fact makes the results achieved with the former breed more remarkable. The system of exhibiting butter was clean but crude, as compared with the dainty manner in which it is displayed at the meetings of the Bath and West and Southern Counties Society. Ice was so arranged that the butter, chiefly in bulk, was kept cool during the hot week of the Show. What, however, was still more important—and this feature of Danish Butter Shows under the Royal Society should be recognised among us—was the data which each competitor supplied—and which was printed even in the catalogue—showing, among other things, the number of cows kept, and the milk, butter, and cheese produced.

Since that day great progress has been made. The Danish farmers now largely consign their butter to us under a system of union which has shielded them from loss both in their country and in ours. Denmark, it will be admitted, has taught us a lesson, but, unlike many others who have so often quoted her example, we recognise in it a form of national energy rather than of technical instruction. In 1891, we again had the opportunity of seeing farms, factories, and schools, but we are unable to point to anything suggestive of superiority of method or practice, whether it be with regard to the cultivation of the soil, the feeding of the cattle, the management of the dairy, or, to put it shortly, the production of butter. Those who declare in the press and on the platform that we owe our knowledge of butter-making to the Danes, are not aware that our system is the very antithesis of theirs, and that, tested side by side, our choicest brands are superior to any butters the Scandinavian people can produce. Our butter, however, is retailed in pounds, and has, practically, no market quotation—theirs is sold by the cask, and has a regular quotation. When our dairy farmers are so strongly urged to make more butter, and to compete against the Danes and other exporting people, it is forgotten that, in our great dairy centres, the farmers are obtaining considerably higher returns by the manufacture of cheese, or the sale of milk, than would be possible even though Danish prices were topped all the year round.

Our first visit was to a Danish butter farm. This farm

was the property of Mr. Harold Brandth, of Elkjœr, and was approached through a flat country closely resembling parts of Holland. It is near the main road which, like a great artery, intersects Jutland, in a district studded with farms that are shielded by groups of trees in rear and flank, as is customary in flat countries, these being visible here and there as far as the horizon. The farm, 700 Danish acres in extent, of which 500 were arable, and 140 plantation, produced, in rotation, rye, barley, mixed grain, oats, roots, clover, and grass. There were 160 cows (Jydsk), in addition to 120 fatting beast and young stock; 80 calves being reared annually, others being fed for beef, weighing 1100 lbs. each, at 18 months old. The average annual yield of milk was 500 gallons per cow. The cows are kept in from May 15 to October 1, receiving 5 lbs. of cake and meal per head per day, and 20 lbs. of turnips, in addition to hay and straw, and the feeding beasts 80 lbs. of roots and 5 lbs. of linseed cake. In summer bran is given once daily. Butter is the leading article of manufacture on this farm, but some cheese and a quantity of pork are also produced. The work is chiefly performed by apprentices, who usually remain for two years. The system carried out is highly intelligent, and both apprentices and employés are required to observe regulations which are daily applied to every branch of the work—weighing and recording in particular.

The traveller in Denmark for the first time will not fail to notice the appearance of the agricultural land. There is no waste. Upon the farm occupied by the writer there is probably ten per cent. of the acreage covered by yards, ponds, roads, hedges, hedgerows, and other unprofitable space. The Danish farmer dispenses with hedges, and he is not required to grow timber for his landlord on land occupied by crops or on the dividing lines of fields. His apparently poor soil—much indeed is really poor—produces, by the aid of liberally made dung, excellent crops; these he houses to the fullest extent, preserving what is not housed in ricks built in the form of a cone with a little thatch at the top. Grass is converted into hay, as we have seen it done in the Swiss valleys, by heaping and heating in the field, as late as the end of September, at which date, in 1891, barley was green and sweet.

In Copenhagen an early call was made upon Professor Segelcke, now growing grey in the service of the Danish dairy farmer, who has been raised to his present position by the work of this savant more than by that of any other man. As with dairy education so with the Margarine question, he is *au fait*. To him the gist of the present Danish Margarine Law is due. When it was proposed in the Legislature to fix a colour test, the Bill was nearly thrown out; but, by the persistence of one member, the

matter was postponed, and Professor Selgecke arranged the present system, which was accepted, thus practically prohibiting the mixing of butter with margarine to the extent of more than 6 per cent. This beats chemical or microscopical analysis, of which, taking the Reichart-Wollny process as an example, the learned Dane thinks very little at present. He considers that the punishment inflicted is still too little, but as the inspectors, who by-the-bye can call in the aid of the police if necessary, have free *entrée* to all butter and margarine shops and factories, the sale of spurious butter, like the admixture of the two articles beyond 6 per cent., is almost nil. Cheese, containing margarine, must be marked and called "*Margarine Ost*" (cheese). Professor Segelcke believes, with us, that the best butter will still be made upon the farm and not in the factory—this belief is exemplified in practice in Denmark to-day. He informed us that efforts had been made to deliver sweet mild butter in Paris, but two shipments weekly were necessary, and this the dealers opposed. At the same time he insists that two shipments must be made to Great Britain.

We subsequently made a visit to one or two shops in the city, where we were enabled to see the working of the Margarine Laws. In one case the trader told us that margarine was sold more extensively than butter, and that women of the middle class, who are desirous of keeping up appearances, mix two pounds of margarine and one pound of butter with the colouring matter from a capsule given for the purpose, and a little salt, their husbands being entirely deceived by the resulting compound. Speaking of British efforts in the margarine question, Prof. Segelcke expressed a hope that the Irish would help, and the belief that the traders using the name "Danish" and "Le Dansk," in connection with their shops or wares, and selling margarine, were libelling his country. At the Royal Agricultural College, as interesting as it is important, we were enabled to see everything worth seeing. Prof. Segelcke's own room is filled to overflowing with historical dairy specimens, from the most primitive of churns, which he brought from Russia, to the first imported Embree Butter Worker, which arrived from America in 1871. We observed that greater attention was paid to the veterinary treatment of horses and practical and scientific farriery, both of which are conducted on a large scale, than at our own Royal College. More important original work has been performed in the laboratory of the late Docent Fjord (Professor of Physics) than perhaps can be credited to any college in Europe. Alas! since our previous visit, Docent Fjord, like his old colleague Professor Jörgensen, has crossed the dark valley. They did not indeed live in vain, their work is a monument to their memory.

Another visit was made to Professor Storch, who, since we called upon him eight years before, had made his well known bacteriological discoveries and cultivations for the proper ripening of cream. His former clever assistant, Sebelien, had been promoted and was Professor of Agricultural Chemistry at the College of Aas in Norway. Discussing Mr. Storch's discovery, we asked him to tell us more of the famous Bacterium No. 18, but he replied that his results were not yet decisive, and, although butter made by the aid of his cultures had been classed as good, it was not so good as that made in the ordinary way. His experiments show him that the flavour of butter is not derived from the fat but from the serum matter. The acid test was referred to, and Mr. Storch, while admitting that it might be useful in cheese-making, considered that in butter-making it would be beaten by good judgment in deciding upon the right moment to churn. We asked his opinion upon the value of albuminoids in the production of butter fat, and he declared that his experiments did not point to the beneficial influence of these constituents of food, or in other words, of food rich in albuminoids—the figures shown us bearing out this statement—and yet it is contrary to the results of some British and American experiments. We learned that complaints had been made of the presence of too much water in some Danish butters, and that samples had been sent to Mr. Storch at the Government Laboratory for examination. He showed us a series of photographs, some seven centimetres in diameter, representing a butter surface of one-tenth of a millimetre in diameter. These samples contained from 11 to 18 per cent. of water, the globules varying in size as much as the fat globules in a sample of Jersey milk. In one cubic millimetre of butter, said Mr. Storch, are three to four millions of such globules of serum or moisture, but the apparent dryness of butter, or the reverse, is no proof that it contains a low or a high percentage of moisture. "Dry" butter may contain 18 per cent., for it is not the quantity of water present that determines its character, but how it is divided. In some of the photographs, which were magnified 600 diameters, the water appeared in large patches, and yet the percentage was not high—this had been badly worked, and a remedy was easily formulated. Time did not permit of an inspection of the laboratory or of the experimental plots attached to the station, all of which had been seen before. In Mr. Storch and his experiment station, Denmark has an institution such as the great British people do not possess in the form of national property.

A visit to the great ship-building yard of the Burmeister and Wain Company, where the famed Danish separator is built,

completed our work in the capital. The director of the compa —a very able Scotchman by the bye—took us with Mr. A: Malmquist, of separator fame, through the various factories which the different operations are performed. Not the least int esting was an apartment literally filled with obsolete machin all of which had been constructed for experiment. There is experimental dairy, in which every new feature is tried—t farmer little imagining how numerous are the tortuous ma: through which the inventor necessarily passes his inventi before it is ready for the dairy.

We cannot forget that in the butchers' shops in Copenhag the meat was stamped in blue ink on the various joints, tl mark signifying that it had passed the sanitary inspector at t public abattoir. The adoption of the same system in tl country, as regards British meat alone, would leave all ii ported meat for recognition by the public, and considerat reduce its price. There are three systems of stamping Copenhagen. The first class abattoir meat is stamped in bl in 12 places in cattle, in 2 in sheep, and 11 in pigs; second cla meat is stamped in black, and the meat imported into the ci in another form; the last named passes through the inspecti station adjoining the central railway on its arrival. A simil system prevails at Roskilde, and some other provincial town although it is not general throughout the kingdom. Under certa conditions, such as accident or disease, stock may be slaughter if the inspector is immediately informed, and the entra together with the healthy carcases are placed before him. T system has been most beneficial, impure meat being practical excluded from the markets altogether. Such a system mig advantageously be employed as a means of discriminati between imported and home-grown meat in this country. traveller on the Continent often hears curious remarks wi reference to dairy produce in Great Britain. At the pub table in a leading hotel in Copenhagen an Englishman inform his neighbouring hearers that Cheshire cheese was exported America and reimported into England.

Unfortunately the Agricultural Schools were closed, t teachers and pupils all being away for the holidays, nev theless a visit was made to Lyngby, which is reached by very pretty walk through a wood not far from the station that name. The school is some distance, perhaps two mil from the village. It is a fairly imposing and well-construct building, with a large fruit garden in front, but it was in the bric layers' hands, new laboratories being in course of constructi On the side of the hill hard by, is a new wooden building English barn-like form, which is known as the museum, a

which, inside and out, is a credit to the establishment. It measures some 24 yards by 40, and is filled with agricultural implements, machinery, tools, models, plans, wool, seeds and samples of all sorts—many rare, others curious from their novelty or their age. This is a feature noticeable in all parts of the Continent, but almost entirely unrecognised in England, where specimens of minerals, or stuffed birds or fish, are considered more or less *de rigueur*, a few gratuitous cases of seeds or grasses from an advertising seedsman also being thrown in. On the left hand of the entrance were collections of obsolete implements and tools, while on the right hand were collections of new or improved implements. An apartment at the end of the building was fitted up as a microscopical laboratory, while near at hand was a similar room with samples of seed, wool, silk and meal, fitted for convenient inspection. In the centre were models of farms, and on the wall tools and plans. The microscopes were by a famous German maker, Saiper of Wetzla by Giessen, near Frankfort, in which town are made the now well-known models of bacteria. A sterilizing machine is also fitted up here. As we passed through the botanical garden we were informed that there were in all 600 varieties of plants under cultivation. Half-a-mile distant is the farmstead, but the buildings are, externally at least, similar to those found elsewhere. No attempt has been made to spend money in model structures. There are some 40 cows, two being tied up in each stall, which is 6 feet square, with a gutter behind, a foot wide, and a passage 5 feet wide. The manger is narrow at the bottom, but sloping away from a back passage a yard wide, all being made with fire-brick. Water is laid on between each pair of cows. On a post at the side of each beast is a black-board with details of the animal. The very large barn near at hand was filled with corn and hay. The buildings, all of which were covered with thatch, were squarely set and kept in respectable condition. The stables were fitted for nine horses, the farm complement; the stalls are usefully arranged, strong wooden partitions being fixed for each animal; no collars are used with the harness, which is light and practical. The swine, an excellent lot, are crossed with the pure York.

NORWAY.

The journey from Copenhagen to Christiania is long and tedious, but enjoyable during daylight. It is, moreover, made endurable, in spite of the monotonously slow speed at which the trains travel, by the conveniently built cars, which are warmed, supplied with water caraffe and glasses, excellent light, and a simple contrivance for enabling the traveller to lie down to sleep.

The journey was made *viâ* Elsinore, from which a perfect little steamer crosses to Helsingborg on the Swedish coast, where the Norwegian train is taken, no stoppage of moment occurring until Gothenburg is reached next morning. In the cars are posted lists of the stoppages for refreshment and the number of minutes allowed. The Swedes are capital caterers, and the buffets, which are often attached to very small stations, are admirably provided. On the arrival of the train the passengers help themselves from the score of tempting dishes, of which perhaps a dozen are hot—many tasting all round. The charge is as moderate as the feast is novel and liberal. Not until a visitor, desirous of seeing the best in agriculture, has made a study of the country and the distances involved in travelling from place to place, does he grasp the fact that Norway and Sweden form a big continent. Its apparent size, moreover, as compared with England, is further increased by the terribly slow speed on the railway—for example, a journey to see a dairy factory occupied a long day, although only from fifty to sixty miles distant. This factory, situated at Rygge, is known as "Rygge Meierei," and was described as a typical factory of the country. We were readily shown over the building, which was attached to a village store redolent of strong-smelling goods. The milk room was provided with three large Swartz vats, 6 feet wide by 16 feet long, well furnished with ice, and filled with milk-cans of the Swartz shape. The floor was of concrete, and the walls plain and white. In the separator room adjoining was a large Danish machine, with milk tank and platform on to which the milk is delivered by the farmers. There is also an engine room, a washing-up room, and a cheese room, where Myse and Norsk cheeses are made, the former being the appetite cheese of the country, resembling the Schabzieger of Switzerland, largely composed of milk sugar, while the latter is a skim milk cheese usually containing aromatic seeds. The prices of these cheeses are 50 öre and 40 öre per kilogramme (2·2 lbs.) respectively (100 öre = 1 krone = 1*s.* 1⅓*d.*). The cheese room equipment consisted of a copper vat, 4 feet 6 inches in diameter, set in shallow brickwork, and a pair of Swedish presses somewhat English in type, but of less skilful manufacture. Butter is daily made on the Danish and Swedish system, as described further on. It obtained in September 2 kroner per kilogramme, and each pound required 27½ lbs. of milk in its manufacture. The chief portion of the labour of manufacture was performed by a strong girl, whose *spécialité* appeared to be kneading. The new milk cost from 8½ to 10 öre per litre, and the separated milk realised 5 öre per litre, in the provincial town of Moss. The farmhouses in this part of the country are roofed with

bright red tiles. The buildings are good and substantial, and painted either red or black. They are generally of rustic design, and not unlike those in parts of Switzerland. Wire fencing was general. A notice board announced that a Norfolk roadster, "King Tom," was at the service of the farming community.

We next inspected the excellent dairy farm of Mr. Rör, who keeps twenty cows, nearly all half-bred Ayrshires—the cross having been made on the Norwegian cow. These animals partook largely of the character and appearance of the Ayrshires, others were three-quarter Norwegian and one-quarter Black Polled Scots. They were polled and black and white in coat. The average yield of the dairy was 2500 litres per annum, or about 550 gallons. The stalls, which were of wood, were 7 feet deep by 4 feet wide—a partition being between each animal. There are no mangers in the stalls, the food being placed in front of each cow on the floor of the raised passage running between the rows. In front of each cow is an opening for the head to pass through to reach the food, when a gate which shuts it off is raised. The gutter behind the stall is 18 in. wide by 3 in. deep, and is littered with sawdust. The width of the passage behind is 4 ft. The central passage already referred to, which is 18 in. higher than the stalls, and 6 ft. wide, is made of brickwork, and on each side are deep gutters which serve as mangers through which water is also run. The manure is all swept through a doorway in the wall at one end of the cowhouse (Fjos). The extent of the farm is 280 moll (4 moll = 1 acre), and a four-course rotation is followed—one year corn, *i.e.*, rye, barley, byg, or oats; and three years grass—red clover, alsike and timothy; some Aberdeen yellow turnips are also grown. The whole of the hay is stored in the centre of the cattle houses. The land is heavy and deeply ploughed. The winter feed consists of few roots and much hay with a little rape cake, which costs 12½ kroner per 100 kilos (220 lbs.). Cotton cake is not appreciated, Mr. Rör believing it to be a dangerous food for cows and calves. Labour costs from 10 to 12 kroner per week. Most of the farmers own their own holdings, this farm having cost 30,000 kroner.

The chief Agricultural College in Norway is at Aas, easily reached by rail, and an agreeable walk from the little station, whence the traveller quickly comes upon some of the students at work upon the farm. The land attached to the College is about 860 acres, but a large proportion is wood, only some 500 acres being in actual cultivation. The College itself consists of three blocks forming three sides of a quadrangle. In the centre are apartments for dining and sleeping, with

reading-room; the left wing includes the laboratories, and the right wing offices and more sleeping apartments. In the centre are ornamental trees backed up by a lake. The laboratories include one for the study of Bacteriology—the apparatus used was, we observed, the production of Rohrback of Berlin. A collection of models, plans, and exhibits, of a more or less practical or scientific nature, enables the College to boast of an excellent museum. In a very stylishly designed wooden building, of essentially Scandinavian character, there is an apartment for drawing, a second filled with implements, and a third equally well supplied with models. There is also a large botanical laboratory, in which is an unusually fine collection of diagrams of plants—in, fact, one of the best we have seen on the Continent—together with models of fruits. A room is also devoted to mineralogy and seeds. The collection of implements and machines includes some which are very old, and many which are new and quite up to date. Other buildings close at hand are connected with the farm work, and have something Swiss in their design. There are no ricks to be seen, all the produce of the farm is secured in huge barns of substantial character, and our guides, who considered that every farm should be properly equipped with such buildings, were astonished that English farmers were contented to build hay and corn ricks. There are standings for 110 cows, of brick without divisions, but provided with a 6 in. gutter, tram-rails behind the cows, and turn-tables in the cross passage in the centre of the house. The calf-house is similarly fitted for saving labour. The cows are Ayrshires and their crosses. The horses, which are small and of no particular type, stand on wooden floors, and have separate stalls. Their mangers are supplied from a tramcar which runs behind. The stables, however, are to be rebuilt. Sawdust is liberally used, and the manure is kept under cover. A few sheep are kept, but neither swine nor poultry. There is a capital forge, and a carpenter's shop where sledges were being prepared for winter work. In the dairy the milk was placed in Swartz cans standing in large ice-vats; but we noticed a hundred-litre vat fitted with hollow tubes, in which the milk is completely surrounded with the iced water. The ice is stored in the open in sawdust, but the winter is more severe than with us, there having been four months' skating during the winter previous to our visit, when the ice had to be daily broken on the adjoining Fjord to enable the steamers to travel. There are several acres devoted to horticulture, the collection of trees being very fine, indeed this department includes a nursery in which young trees are grown for sale, the value of those sold in the previous year having been 16,000 kroner. The pupils, who are taught all the

usual subjects, are an intelligent lot of fellows, and they are evidently not men who go to waste time. If appearance is any criterion, they are destined to work hard for their livelihood. At eleven o'clock, a group of twenty came out of the hall to take up practical work. They are required to plough and assist in the general work of the farm. There are a few free places, but the bulk of the students pay fees—those who enjoy the luxury of a separate room paying the highest, but, in all cases, the fees are extremely small. We learned in Norway that there is much to be done in the north of the country, where the people have little idea how to make the most of the soil. Such schools as Aas will materially minimise this difficulty, for the pupils not only have the advantage of the highest practical instruction, but, side by side with it, a scientific education.

Before leaving Christiania we interviewed Landbrugg Direktor Smit, who takes considerable interest in Dairy Instruction. Mr. Smit objects to more than from six to eight pupils being at a Dairy School at one time, or more than four at a purely Cheese School, inasmuch as they cannot possibly gain practical knowledge, which depends so much upon actual experience. A few years ago he sent two young men to Switzerland and England to learn to make Gruyère and Cheddar cheese respectively, with the result that both varieties are made as well as in their native districts—selling well and paying the makers better than butter. The Cheddar process was learned at Tunley under Mr. George Gibbons, who was, we found, responsible for a good deal of the advanced knowledge of Dairy farming in both Norway and Sweden. Butter is still made by the hand, but machine work is rapidly extending. The feeding of cows is studied at the agricultural colleges, but there are no scientists in Norway, such as the late Professor Fjord. Among the ablest practical experts is Mr. Thomsen of Christiania. The best Dairy factory is at Stange, and there is a large condensed milk factory at Hamar. Margarine is frequently sold as butter, and although frequently fined the dealers continue the practice.

SWEDEN.

We had the advantage, on arriving in Stockholm, of an introduction to Professor Lovën, the Secretary of the Agricultural Department, who very kindly furnished both advice and valuable information. No more agreeable or instructive afternoon was spent during our month from home than that in which we were taken over the great Separator Works by Dr. de Laval himself, the presiding genius of centrifugal milk separators. The word "Separator" is a household word

among cabmen and car-drivers in Stockholm; it is the only English necessary for a safe conduct to the establishment. The great Swedish factory is worthy of inspection, and the work in progress, with the famous Doctor's explanations, terse and original as they were, conveyed an excellent idea of the enormous labour involved, not alone in making the machines, but in testing them. The testing is not only an elaborate, but a very delicate process, requiring the attention of men of high training and skill. We cannot wonder at the simplicity with which the machines work, or the practically entire absence of accidents, when we see that so much time and labour is expended in this department, and when, as we noticed, the work is required to be as true as a hair before a machine is passed. Dr. de Laval showed us a new specimen of his inventive genius, a steam-engine which was working in the experimental dairy. This engine is about 2½ feet square, and is driven from steam 60 ft. away, the driving-belt revolving 3000 times per minute with a pressure of 60 lbs. It drives all the Separators in turn, and stands in a little corner of the very beautiful dairy-room. Among other questions discussed with Dr. de Laval, was that of the immediate manufacture of butter from sweet milk by hand power. His opinion is that this might be done, but was chiefly a question of ripening the cream, without which the butter would not be sufficiently aromatic in flavour. We shall not be surprised, however, to find that he will solve this question, and introduce some still more startling invention to our notice. Dr. de Laval is quick, concise, and enthusiastic, and, if genius can make man original, he is essentially an original genius, effervescing with the passion for inventive progress, which has effected such a revolution in the dairy world, and materially benefited his country. England has paid the Laval Company £10,000, France £2,000, and Germany £38,500.

The chief Agricultural Colleges in Sweden are at Alnarp and Ultuna. Ultuna is a few miles drive from the University town of Upsala, which is several hours run by rail north of Stockholm; it is reached through woods and groves and across an open country without hedges, the fields being divided by dry ditches. The land appeared to have been all ploughed and the corn sown, much, indeed, being up and strong, yet September had not closed; the bright colours of the timber trees, the red buildings on the farms, the groups of cattle dotted here and there, and the brilliant sky, presented a landscape not easily forgotten. We had the advantage of the guidance, over the farm and College, of Professor Post, Chief of the Chemical Laboratory, who conducts some excellent experimental work in the growth of hops, beans, maize, lucerne—which, by-the-bye, he finds does not profit

by the use of dung—sainfoin, clovers, serradella, oats, wheat seven plots up and strong, sown in August), rye, grown regularly on the same plots; potatoes, 400 varieties; *Bromus arvensis, Bromus inermis*, not good; *Dactylus glomerata*, not good; *Avena elatior*, good; and other grasses. Teachers are given a course under Professor Post in winter, and in the summer his laboratory is practically an experiment station. Students pay 600 kroner for the first year, and 700 for the second, which completes the course, and we are bound to say that for so small a fee, everything, even to the single bedrooms, is exceptionally nice. The farm buildings are extensive, and irregular—sheds, barns, and granaries of novel design and bright colours being dotted here and there. The museum was, of course, *en evidence* as everywhere, and well supplied with models, skeletons, stuffed birds, minerals, drawings, and a thousand other items. The dairy is a leading feature at Ultuna, for it is a dairy-school of first importance. Butter, cheddar, cummin and skim milk cheeses are manufactured. The head dairyman was a year in England with Mr. Gibbons and Mr. Willis. The very excellent dairy might be studied by some of our educational enthusiasts with advantage. Next to that at Alnarp, and at Reggio in Italy, it is one of the best we have ever seen attached to a Dairy School. We do not however believe that the English market has anything to fear from Swedish competition. The butter, considered good in Sweden, is not only very salt, but strong in flavour; the spiced cheese is tough and leathery, and the cheddar strong and wanting in character. We perceived the same faults throughout the country.

There is an excellent Agricultural Museum in Stockholm. One of the best exhibits is a series of 36 tubes containing samples of feeding stuffs of all kinds grown on the farm; and side by side tubes of smaller size containing the actual proportions of water, protein, cellulose, carbohydrates, fat and ash which these contain. There are some large and excellent models of cattle-houses, and also of moulds, such as *Aspergillus*, showing their habit of growth.

The finest town dairy in Scandinavia is the Mjoekforsalmings Actiebolag at Stockholm. Here 10,000 litres of milk are daily separated, except upon Mondays when 15,000 litres pass through the large Alpha machine, the first put up, which separates 1500 litres per hour at 64° C., and had already run a year. The milk is pumped up to an upper floor where the separating room is situated, being Pasteurised before entering the drum. After separation, the cream passes through the floor over a cooler, and the skimmed milk into a large tank. An Otto gas-engine of 4 H.P. nominal provides the power. The cream is ripened

for churning but kept in iced tanks as long as is found necessary—the thick cream at 8° C. and the thin at 9° C., the former taking thirty minutes and the latter forty minutes to churn. There is a battery of six Holstein churns driven from separate belts on the same spindle, the work being chiefly managed by women.

The butter came in two churns during our visit to the churn room, and was in excellent grain. It was removed in this form to a sieve, the lid and sides of the churn being swept clean with a little hand besom. The butter is worked on tables of 4½ feet diameter after leaving the huge wooden troughs in which it is placed to drain. After working, it is laid in rolls under ice to harden for three or four hours, when it is salted with from 3 to 4 per cent. of salt, again worked, left for a while, and subsequently worked a third time. The first working is very thorough, the buttermilk being rubbed off the machine at each revolution by the hand. When packed in casks for export, as a great deal is, it goes into a cellar. Ice is freely used everywhere, and the milk cans for delivery are simply smothered with it in warm weather. Small tramcars are utilised in the establishment with great advantage. A large trade is conducted in milk for children's use, and the apartment in which this is prepared is the very climax of ingenuity. The bottles are washed in a steamed water-bath, then rinsed, and finally placed over a jet of steam. The milk used in this department is filtered through sponges, which are daily boiled, but we were informed that sand was to be used instead. Four bottles are filled simultaneously by a machine, and placed in cases of twelve. They are then placed in a lift which comes down into the next apartment. Sterilizing follows. The cooling-room is fitted up with equal perfection. In the cheese-making room is a vat 16 ft. long, and a gang press, cheese being made in summer when the skim milk is not all sold. The vans for horse and hand power are excellent, and well fitted. The best fresh butter was selling at 2·35 *k.* the kilogramme (about 1*s.* 2*d.* per lb.), but it was too salt for the educated British palate. Butter for winter preservation is all made from Pasteurised cream.

In Sweden there are four margarine factories, two of which are in Gothenburg. To use an Irishism, the best butter shop in Stockholm is a margarine shop, which is most expensively fitted. This is known as the Arboga, and is in the best street of the city. No other goods are displayed, and the margarine is packed in the regulation oblong boxes, stamped on every side. There are really no shops in Stockholm in which dairy goods are even decently displayed.

We inspected a factory in the country—one of the many small

establishments that are found in all parts of milk-producing Sweden—which was not encouraging. The building, equipped with separators and Holstein churns, and a primitive cheese-plant, was anything but sweet and clean—indeed both were impossible with broken concrete floors. The cream skimmed in the morning remains until 6 P.M., when 1 per cent. of sour buttermilk is added in summer, and from 2 per cent. to 3 per cent. in winter. It is then left in large tubs at a temperature of 18° C. (64° F.) until 8 A.M. next day, when it is churned. The milk costs 8 öre the litre, and 27 litres are required to make a kilogramme of butter; the gross cost of the butter is 2 kron. 16 öre, or nearly 2*s.* 4½*d.*, plus the labour. The separated milk realises 2 öre to 3 öre per litre on the spot, or 6 öre at Stockholm. The butter made in the morning is placed in the hardening box until the afternoon, when it is again worked up and packed in clean white tubs for England, each tub being lined with butter-paper. There are 2000 such factories in Sweden, the bulk of the butter made coming to this country *viâ* Malmö and Gothenburg, the best markets being Newcastle and Manchester. We found the idea prevailed that all butter made in England and France was from sweet cream. We ventured to remark that, on the contrary, cream is ripened or soured in both countries, in the vast majority of dairies, and to add that our butter is sweeter than that made in Sweden. Cummin seed cheese is made from separated milk. We saw very little of the butter extractor in Sweden, although it was in work at Ultuna school, and were informed that, when the attendant stood by to regulate, the skimmed milk only contained from ·1 to ·2 per cent. of fat, but otherwise it was found that the fat rose to ·3 and even ·4 per cent.

By far the finest things we inspected, and perhaps they are the best things of the kind extant, were the cattle houses on the great dairy farm at Mölnby, a little village in telephonic communication with Stockholm, although some hours distant by rail. There are two houses, a new one near the station, and an older one some two miles away. The first house is practically a huge hall, with a capacious granary above resting on iron pillars, and a few smaller apartments at each end. It is built of stone, and brick, and Swedish woodwork, all substantial enough to last for five hundred years. Within the hall are 120 cows, chiefly small Ayrshire crosses, all perfectly clean, standing 15 in a row of 19 yards, with 5½ ft. passages behind each row, and raised feeding-passages of similar width in front. The floor of the stalls is of linoleum, and there are no partitions, each cow being fastened by ringed chains to iron upright stanchions right and left. The gutter is 14 in. wide, and littered with peat moss

to absorb the liquid. The manger, 18 in. wide, is merely a groove in the central passage, one such groove being on each side. The whole is made of concrete. Between the cows and the manger is an iron railing, the most novel thing of the kind we remember to have seen, fitted in the concrete work, which is 18 in. high; the iron bars forming the railing are 2¾ ft. high by ¾ to 1 in. in diameter. All the bars are fixed with one exception, and this is loose, but riveted to the bottom, sliding right and left at the top. On each side of this bar, and exactly in the centre of the stall, are two others which are fixed, and which slope in opposite directions, almost forming the letter **V**, or actually **\ /**. The loose bar is between these, thus **V/**, so that when in this position the cow's head cannot pass throug. When, however, it is feeding-time, the cowman passes by the head of each row of cows, pulls a chain to which all these loose bars are attached, when an opening is made thus **\\/**, and the cow's head passes through to her food. Overhead is a wire, to which the number of the cow is attached. The stalls have a slight covering of sawdust and straw. The mangers are supplied with water from a tap at each end and an overflow. A feeding passage, 9 ft. wide, runs along one side of the building, and this is fitted with tram rails. At one end are calving boxes, turf and sawdust stores. A wash-room, in which we noticed the clean stools, aprons, and blue milking-gowns of the milkmaids, all in their places. Overhead is a room for the head cowman, out of which he can step into a small gallery and see every cow in the building. On the other side is a narrow passage with grips, fitted with occasional sinks, for carrying off the water used in washing the floors. At the other end are stores for meal, cake, and bran; a milk-house, with coolers and Pasteuriser; a boiler-room, washing-up tank, and racks for the pails. Outside are railed exercise yards, and arrangements for the exit and entrance of each lot of cows. There is also a well-arranged slaughter-house. Overhead is the store or granary filled with hay and other bulky food, and a wonderful place it is. The building covers 200 cows, of which only 20 are in boxes. We were taken over it by the director, a most able man, the architect of the whole concern, and who, although blind, named every part of it as we walked round upon his arm. It is situated in a beautiful spot in the centre of rich temporary clover pastures, which are left down for three to four years, during which the clover falls off, and Timothy grass comes to the front. We noticed a few special features at this imposing establishment, which covers hay, straw, and food of all kinds. The calves are fed from the pail outside their boxes. There are holes in the gates enclosing them, to enable them to put their heads through

and to reach their milk-pail, which is placed in a wire receptacle beneath. Ice is stored in large quantities under turf and sawdust. The hay is dropped from the granary above on to a tram-car ready to take it direct to the cows. The meal and malt dust (used largely) are weighed out and sent down shoots into separate bins for each division of cattle. The manure is carried away on the tram-rail. In this part of the country carts are frequently drawn by cows.

We pass on to Alnarp, the chief Agricultural College in Sweden, to which we were accompanied by Professor Nathorst, formerly the Director. The chief is now Professor Hugo Winberg, who certainly deserves great praise for the perfection at which he maintains the very considerable equipment of the College and farm. The former was closed, but we were shown everything connected with the latter. The district—it is in the flat and fertile part of the south of Sweden—is famous for its sugar beet. The crop on the College farm in 1890 was worth 60*l.* per hectare, about 24*l.* per acre, and was grown on medium loam by the aid of 400 kilogrammes of superphosphate, and 350 kilos of nitrate of soda per hectare. The average annual value of the crop is from 40*l.* to 45*l.* The rotation followed is barley, clover two years, wheat, oats, fallow, wheat, and beet. Mr. Winberg revels in stock breeding, and he is taking great pains to produce the best. There are, in all, 275 head of cattle, Shorthorns, Dutch and cross-bred, and strangely it is found that the fleshiest animals yield the best milk. The cows number 178, and among them—they were grazing on the clover pastures—were some excellent pedigree Shorthorns.

There are two excellent and, as usual, very substantial cattle houses, one capable of accommodating 300 head. Concrete passages, stalls, mangers, tramways, all most perfect in their way, were arranged upon the principle we have already described. A board is attached to the standing of each cow, with full details of her age, &c., and records of the milk yielded are also kept. The cows calve chiefly between October and December, so as to come in when milk is of most value. The purchased food used is chiefly rape, palm-nut, cotton or sunflower-seed cake, depending on the price. There are three old bulls, two Shorthorns, and a Dutch whose dam yielded 6000 litres in a year. The hair on the tails of the cows is cut off short. Pig-breeding is an important industry in Sweden, and great attention is paid to the improvement of swine. At the time of our visit the stock at Alnarp was small, consisting of 153 head, chiefly white Yorks, and crosses of the York on the Swedish pig. Swine are bred and fed for the British market, their chief food consisting of barley-meal, potatoes, skim milk,

and whey. The piggeries are the most elaborate and substantial that we have ever had the opportunity of seeing, with the exception of those of M. Aubergonois, of Lausanne, which are illustrated in the 'Book of the Pig;' but even these are much smaller. The chief Alnarp piggery is 60 yards long, and covered with a roof of concrete and iron. The sties are of various widths, by 15 feet in depth, and there are separate feeding pens for sucking pigs. At one end of the building are cooking tanks, and the food is pumped into a vat on wheels, which is run down the central passage, filling the various troughs from hose on each side as it passes. Another large piggery is built in a different style, but, in each case, the urine is drained into a tank. There are excellent yards to each house, for the pigs to revel in, with tanks for their bathing, and sheds for them to lie in in bad weather.

Alnarp is a high-class dairy school, in charge of Dr. Engström, pupils in the lower class taking a twelve months' course, of which six months are spent in the dairy, four months with the cattle, and two months in the study. In the higher class, four months suffice for the dairy, two months are devoted to the cattle, and six months to study. Chemistry is taught as in the College itself. The dairy building, which is giving place to a new one, is fitted with every necessary appliance for cheese and butter-making. Skim cheese is made daily, full-milk cheese two or three times a week. Butter is regularly made for export to England, the quantity of milk required per pound being 26·9 lbs., which is good, considering the large number of Dutch cattle in the herd.

We inspected an important butter factory at Kiel, a new building, excellently equipped, and managed on the co-operative system, as is common in Holstein and other parts of North Germany, and also the dairy experiment station in the same town, which is well known throughout the dairy world. Here every opportunity is afforded, by short courses at convenient periods, to enable farmers and students to study the science and practice of advanced dairying, and the feeding and management of cows. The station is not large, but it is well equipped, and is under the direction of a most competent staff.

We were impressed with the fact that in all the Scandinavian countries, as in North Germany, the greatest efforts are made in connection with the butter industry, and we have every reason to believe that, however keen the competition, these people will strive to keep up with it, so completely does it enter into the very life of their agricultural system. The cattle buildings and general arrangements of the best farms are of the most advanced and practical type. In this respect, at least, our neighbours

are on a level with us; but their systems of cropping, their implements, and their cattle, leave much to be desired. There are, however, able men in each country striving, by precept and example, to extend a knowledge of all that is worth knowing, who are not likely to relax their efforts until they have enabled the native farmers to do all that climate and soil will permit.

IX.—*Hereford Cattle for Dairy Purposes.* By JOHN WHITE, of Zeals.

BEEF *v.* MILK.

HEREFORDS have not, as a rule, been kept for dairy purposes by the large majority of their breeders, whose principal object has been to develop the fine qualities they especially possess, of early maturity and aptitude to fatten, rather than the milk-yielding powers. Where, however, the production of milk is aimed at, and the animals have been selected from good milking strains, they can be favourably compared with any other breed. The system followed in Herefordshire of allowing cows to suckle their calves until the latter are six or even eight months old is prejudicial to the future development of milking qualities. The milk veins and udder of the animal are never distended, and the inherent propensity to make milk has been materially lessened from this plan having been adopted for successive generations. Further, the placing of a lot of flesh on a young animal tends to give it an aptitude, on arriving at maturity, to produce beef rather than milk.

THE WRITER'S SYSTEM.

Pure-bred Herefords have been kept at Zeals since 1819 for dairy purposes, having been introduced there by my late uncle, Mr. Robert White, whose success in the different show-yards sixty years ago was well known. My present system is as follows:—I let ninety cows at an agreed price per year, finding them in land and making the hay. The calves are reared by hand with skim milk until three months old, when I allow the dairyman a quarter's rent of a cow for each calf. About twenty heifers are reared each year in this way, and are brought to the dairy at two years old, this age being preferred to three years, as those calved earlier eventually prove the best

milkers. The cows are kept during the winter months on straw and roots, being tied up in the stalls at night and allowed to run on the pastures by day until the middle of January, when they begin calving. They are then put on hay until May 1st, when they are turned to grass. I may mention that the use of that grand bull "Helianthus" (4641 in the 'Hereford Herd Book'), which I purchased at the dispersion of the herd of the Earl of Southesk in 1874, and which weighed 3024 lbs. at ten years old, was to a great extent the means of improving my herd for dairy purposes, his progeny being invariably heavy milkers yet having plenty of good flesh and an aptitude to fatten.

HEREFORDS v. SHORTHORNS.

I obtain as good a letting price for my Hereford cows as my neighbours do for their Shorthorns. One dairyman rented fifty of my cows for thirty years, and never expressed a wish for me to purchase any other breed, thereby clearly showing that he was perfectly satisfied with Hereford cows.

A friend of mine had a Shorthorn herd, and his cheese-tub would not contain the milk they gave. He sold out his Shorthorns and established a herd of Herefords, when he found the tub was not filled, but the result was that he made more cheese from the Herefords than the Shorthorns. This showed that the milk from the former was of much better quality than that of the latter, and, as the Herefords were smaller consumers of food, they were more profitable to him to keep.

I have tested the relative quality of the milk of Herefords, as compared with that yielded by Shorthorns, and I find the milk from the former to be 19 per cent. cream to 15 and 17 respectively from two herds of the latter. I may add that, some time since, my dairyman tested the milk from a half-bred heifer I had purchased, and simultaneously that from one of my pure-bred Herefords, and he found the milk from the latter 4 per cent. better than that of the half-bred. My late dairyman, who was with me for thirty years, states that he always thought the milk of the Herefords was much richer than that of the Shorthorns.

It is a great mistake to suppose Herefords have no propensity to produce milk. My endeavour has always been to select from good milkers, and I think I have succeeded in establishing a herd which can compare favourably for dairy purposes with that of any other breed, especially when the amount of food consumed and the annual depreciation of the animal are taken into consideration.

APTITUDE TO FATTEN.

As a monetary investment, there is a further advantage in the Hereford dairy cow, for, when she has finished milking she is, owing to her aptitude to fatten, soon fit for the butcher.

My opinion is that there is nothing in a time of agricultural depression so valuable as a good herd of cattle, and where there is a large quantity of straw and roots to consume, and the land is of moderate quality, I know of no better breed than the Herefords for the farmer to keep.

X.—*The Society's Contribution to Dairy Education.* By THOS. F. PLOWMAN, Secretary and Editor.

RETROSPECTIVE.

THE GROWTH OF THE DAIRY SCHOOLS.—If, in the autumn of 1888, when the Society opened its first Dairy School, those who were mainly responsible for the new departure had ventured to predict that it would ever attain to its present proportions, they would have been regarded as unduly sanguine. But, to use an historic phrase, "a good deal has happened since then." At that time there was no Government Board of Agriculture to encourage and assist voluntary efforts to promote agricultural education, and that such a windfall, as the Local Taxation Act of 1890 provided, would be dropped into the County Council lap, did not come within the range of speculative probability. Therefore, it was with but little outside encouragement that the Society embarked upon its new venture in a cautious and tentative spirit, but, withal, with a cheerful belief that the experiment was well worth the trying. The scheme was worked on novel lines, so experience had to be gained and precedents created by an evolutionary process.

The story of the setting forth on its travels of the Society's first Butter School will be found in the 1888–9 volume of the 'Journal,' and the life and adventures of its successors have been recorded in later volumes. The scheme has so far stood the test of time and experience that in its main principles, as originally laid down, no alteration has been necessary.

It was soon recognised that a disinterested effort was being made to lend a helping hand to an industry suffering from a plentiful lack of that knowledge which is, nowadays, so

essential to the successful carrying on of any occupation whatsoever. As soon as this was fully realised the success of the movement was assured, and the migratory Dairy School began to be wanted in various directions. The main demand for it arose, however, when County Councils commenced allocating some of the funds at their disposal to the purposes of Technical Education in Agriculture. Then it was that the information and experience which the Society had gathered were fully drawn upon by public bodies, and from many quarters far distant from its centre of operations, as well as from those nearer home, came the cry, "Come and help us." The Society gladly responded, either by itself equipping and conducting schools, or by rendering such help as enabled other bodies to do so.

So the Dairy School system has gradually grown, until it has become a main feature of the Society's programme of operations, and one which taxes its working resources from year's end to year's end. No longer can it be said that the Society exists for the purpose merely of holding an Annual Exhibition—important and useful as that, undoubtedly, is—for its organisation is now fully utilised throughout the year in the promotion of other and kindred objects, for the improvement of agriculture. It was in 1885, that, on the initiation, mainly, of Sir T. D. Acland and the late Mr. J. E. Knollys, the Council accepted the principle, that the Society should not live on shows alone, and put it into practice by starting Experiments on Crops, which have been continued ever since. The after-establishment of the Dairy Schools, which was due, especially, to Sir R. H. Paget, Bart., M.P., Mr. N. Story Maskelyne and Mr. G. Gibbons, was simply an extension of this policy.

EXPENDITURE.—Since the establishment of the Dairy Schools in October, 1888, the Society has expended no less a sum than 9379*l.* 0*s.* 9*d.* in the promotion of Technical Education in Dairying. This, however, does not by any means represent the total amount devoted to this object, through the instrumentality of the Society, as it does not include such expenses as the hiring and fitting up of buildings for the travelling Butter Schools and other local liabilities undertaken by the District Committees co-operating with the Society; nor the cost (defrayed by the Society) of the Working Dairy at its Annual Exhibition and of the Students' Competitions therein.

The summary on page 121 shows how the Society's work in this direction has grown from year to year.

In considering the cost of the Schools, it must be borne in mind that the Society has exceptional facilities for working them on economical lines, having an organisation ready to hand, and much help of a voluntary character available.

to December 31st, 1892.

Year.	Nature of School.	Receipts. Fees, Sales, &c.	Receipts. County Council Grants.	Receipts. Government Grants.	Receipts. Total.	Disbursements. Practical Section.	Disbursements. Experimental Section.	Disbursements. Total.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1888	Butter ..	113 15 7	..	100 0 0	213 15 7	193 11 11	..	193 11 11
1889	Butter ..	254 1 8	..	200 0 0	554 1 8	640 13 11	..	640 13 11
1890	Butter ..	126 11 2	..	250 0 0	1,241 18 11	506 2 2	..	1,518 13 9
"	Cheese ..	765 7 9	..	100 0 0		1,012 11 7	..	
1891	Butter ..	489 9 6	1,301 3 7	150 0 0	3,148 14 8	1,554 18 2	..	2,666 17 3
"	Cheese ..	858 1 7	..	350 0 0		988 4 4	123 14 9	
1892	Butter ..	271 18 8	2,761 16 7	..	3,917 3 7	2,482 13 9	..	3,830 16 10
"	Cheese ..	880 8 4				957 4 7	390 18 6	
Present liabilities to County Councils*		..	..	..	..	..	..	528 7 1
		3,759 14 3	4,066 0 2	1,250 0 0	9,075 14 5	8,336 0 5	514 13 3	9,379 0 9

* Viz.; balances of Grants unexpended up to December 31st, 1892.

CENTRES AND STUDENTS.—The accompanying tabular Statements show the number of Students at each centre visited by the Butter and Cheese Schools up to December 31, 1892.

BUTTER SCHOOLS

Conducted by the SOCIETY from October 15th, 1888, to December 31st, 1892.

County.	Centre.	No. of days School was open.	Year.	No. of Students. 10 days.	Shorter periods.	Total.
Brecknockshire ..	Builth	7	1890	..	14	14
Devonshire	Exeter	21	1889	22	3	25
Dorsetshire	Bridport	21	1890	26	..	26
,, ...	Fontmell Magna ..	11	1891	12	..	12
,, ...	Portesham	21	1892	24	..	24
,, ...	Maiden Newton ..	21	,,	23	..	23
,, ...	Bridport	11	,,	11	1	12
,, ...	Charmouth	21	,,	16	..	16
,, ...	Buckland Newton ..	21	,,	14	..	14
Gloucestershire ..	Berkeley	11	1889	9	..	9
,, ..	Gloucester	21	,,	20	6	26
Herefordshire ..	Bromyard	11	1891	10	..	10
,, ..	Kington	11	,,	4	15	19
,, ..	Hereford	21	,,	21	5	26
,, ..	Ledbury	11	,,	12	4	16
,, ..	Leominster	11	,,	8	4	12
,, ..	Ross	11	,,	9	1	10
Kent	Tonbridge	21	1892	12	11	23
,, ...	Westerham	11	,,	11	3	14
,, ...	Igtham or Wrotham	11	,,	6	7	13
,, ...	Maidstone	10	,,	1	7	8
,, ...	Cranbrook	11	,,	10	12	22
,, ...	Tenterden	11	,,	10	2	12
,, ...	Ashford	31	,,	20	5	25
,, ...	Hythe	21	,,	17	6	23
,, ...	Dover	11	,,	4	4	8
,, ...	Sandwich	11	,,	8	1	9
,, ...	Swanley	31	,,	32	..	32
Middlesex	Hampstead	21	1889	24	..	24
Oxfordshire	Oxford	21	,,	20	5	25
Pembrokeshire ..	Pembroke	31	1890	45	..	45
Radnorshire ..	Llwyn Madoc ..	7	,,	..	7	7
,, ...	Newbridge-on-Wye	7	,,	..	7	22
,, ...	Rhayader	21	,,	20	2	7
Somersetshire ..	Shepton Mallet ..	31	1888	32	2	34
,, ...	Clevedon	21	1889	27	9	36
,, ...	Yeovil	21	1891	21	2	23
,, ...	Crewkerne	21	,,	17	4	21
,, ...	Langport	21	,,	19	11	30
,, ...	Williton	11	,,	6	6	12
,, ...	Minehead	11	,,	12	6	18
	Carried forward ..	688	..	615	172	787

BUTTER SCHOOLS—*continued.*

County.	Centre.	No. of days School was open.	Year.	No. of Students. 10 days.	Shorter periods.	Total.
	Brought forward ..	688	..	615	172	787
Somersetshire ..	Chard	21	1891	12	..	12
,, ...	Taunton	31	,,	26	2	28
,, ...	Weston-super-Mare	21	,,	20	6	26
,, ...	Axbridge	21	,,	11	6	17
,, ...	Glastonbury	21	1892	16	2	18
,, ...	Highbridge	21	,,	16	1	17
,, ...	Midsomer Norton ..	21	,,	19	..	19
,, ...	East Harptree ..	21	,,	17	4	21
,, ...	Bath	31	,,	34	8	42
,, ...	Wells	21	,,	20	6	26
,, ...	Nailsea	31	,,	29	..	29
,, ...	Keynsham	21	,,	21	5	26
,, ...	Somerton	21	,,	21	1	22
Surrey	Oxted	21	1891	22	..	22
,, ...	Lingfield	11	,,	13	..	13
,, ...	Horley	11	,,	12	..	12
,, ...	Chobham	11	,,	12	2	14
,, ...	Leatherhead	11	1892	4	..	4
,, ...	Dorking	11	,,	6	3	9
,, ...	Guildford	21	,,	9	8	17
Sussex	Wiston Park, Steyning	7	1890	..	15	15
Warwickshire ..	Coventry	21	1889	22	7	29
Wiltshire	Swindon	21	1888	21	11	32
,, ...	Chippenham	31	1889	36	8	44
Worcestershire ..	Worcester	21	1890	24	6	30
		1189	..	1058	273	1331

CHEESE SCHOOLS

Conducted by the Society from May 1st, 1890, to December 31st, 1892.

County.	Centre.	No. of days School was open.	Year.	No. of Students. 4 weeks.	3 weeks.	2 weeks.	10 days.	1 week.	Shorter Periods.	Total.
Somerset ..	Palace Farm, Wells	184	1890	5	1	6	..	51	28	91
,, ..	Vallis Farm, Frome	229	1891	12	1	12	..	32	9	66
,, ..	Compton House Farm, Axbridge	214	1892	14	..	5	2	16	2	39
		627		31	2	23	2	99	39	196

THE WORK OF THE PAST YEAR.

BUTTER SCHOOLS.—At the request of County Councils, the Society during 1892 conducted Travelling Butter Schools for the Counties of Somerset, Surrey, Kent, Glamorgan and Dorset.

The Society has carried on these Schools without any charge to the County Councils beyond that for actual out-of-pocket expenses.

The centres visited and number of students at each of the 1892 Schools are given in the Tabular Statement on page 122, and the receipts and disbursements connected therewith on page 127.

Under the arrangement with the Somerset County Council, the students' and spectators' fees and the proceeds from sales of produce were received by the Society, but, in the case of other County Councils, these receipts were taken by the District Local Committees.

The Butter School teachers are the Misses A. Angus, A. A. Benjafield, M. Benjafield, M. Davey, M. Smart, and A. Williams. There are also several dairy assistants, and an engineer in charge of the machinery, attached to the Schools.

CHEESE SCHOOL.—The Cheese Schools of 1890 and 1891 were unconnected with any body other than the Society, but last year's Cheese School was carried on by the Society on behalf of the Somerset County Council, who made a grant of 1000*l.* for that and the Butter Schools.

A suitable and convenient site was found for the School at Compton House Farm, Axbridge. The occupier (Mr. Charles Tilley) is a tenant of Sir Charles Mordaunt, Bart. The usual arrangements were made with the tenant for the use and control of his dairy, the supply of milk from his cows, and the boarding and lodging of students in his house. The School was opened on April 1, and closed on October 31.

As in previous years, the Society had the advantage of the services of Mr. H. Cannon, of Milton Clevedon, to supervise the school, and of his eldest daughter as teacher. The daily supply of milk was checked and other assistance rendered by a bailiff.

Satisfactory evidence of the practical character of the teaching was afforded by the good prices realised for all the cheese made. Messrs. Hill Bros., of Evercreech, were the buyers, and the quantity sold included the entire output.

For purposes of comparison, the amount of cheese made at the Society's three Schools and the prices realised are given on opposite page.

AMOUNT of CHEESE MADE and PRICES REALISED.

ate.	Place.	Number of Draft.	Weight.	Total weight.	Price per 112 lbs.	Average price per 112 lbs.	Milk used.
			cwt. qrs. lbs.	cwt. qrs. lbs.	s. d.	s. d.	galls.
890	Wells	First (May 1 to 31)	37 1 12		61 6		
"	"	Second (June 1 to July 20)	35 2 2	198 1 7	66 6	65 6	23,24
"	"	Third (July 21 to Aug. 31)	21 2 19		66 6		
"	"	Fourth (Sept. 1 to Oct. 31)	103 3 2		67 6		
891	Frome	First (Apr. 1 to May 11)..	26 2 17		54 0		
"	"	Second (May 12 to June 11)	33 1 17		65 0		
"	"	Third (June 12 to Aug. 11)	57 1 24	176 1 13	66 0	60 3	20,78
"	"	Fourth (Aug. 12 to Oct. 31)	57 0 0		66 0		
"	"	Fifth (Nov. 1 to Nov. 15)..	1 3 11		50 0		
892	Axbridge	First (April 1 to 30).. ..	17 2 7		58 0		
"	"	Second (May 1 to 31) ..	26 0 17		65 0		
"	"	Third (June 1 to Aug. 18)	58 3 6	166 1 20	68 0	66 3	20,62
"	"	Fourth (Aug. 19 to Sept. 30)	40 1 3		70 0		
"	"	Fifth (Oct. 1 to Oct. 31) ..	23 2 15		70 0		

Additional sums of 12*l.* 16*s.* 1*d.* in 1891, and 8*l.* 3*s.* 7*d.* in 1892 were also received for truckle cheeses and whey butter made at the School.

The Experimental Section of the School, which was started in 1891, was continued during 1892; a laboratory and a scientific expert (Mr. F. J. Lloyd, F.C.S.), with a qualified assistant, being attached to it.

Full particulars of the conditions under which the researches were conducted, and the results that were obtained up to the end of 1891 were published in the Society's Annual Journal of last year, and have since been reprinted in the form of a pamphlet, which can be obtained of the Secretary. Detailed accounts of Mr. Lloyd's "Observations" for the current year will be found further on in this volume.

The number of students at the Axbridge School is given in the Tabular Statement on page 123, and the total receipts and disbursements on page 127.

GENERAL REMARKS.—The Board of Agriculture has continued its interest in the Society's Schools, which have been inspected during the past year, from time to time, by Mr. Brooke-Hunt on its behalf, who has expressed himself most favourably with regard to them. In a report presented to Parliament during the last session by the Board, in which detailed particulars are given of the work of the Society, the latter is credited with having "been virtually the pioneer in the establishment of dairy classes." With reference to the Frome Cheese School, it says, "The pupils were mostly

of the farming class, and the results of instruction, so far as can be ascertained, are better produce and better prices. Some large cheese buyers in the neighbourhood have spoken highly of the value of these Cheese Schools in the way that they are improving the make of cheese in the district." The report also alludes to "the interesting results and observations" recorded in the Experimental Section of the Cheese School, and reproduces a considerable portion of Mr. Lloyd's Report, which appeared in the last issue of the Society's 'Journal.' The Board has further shown its appreciation of the Schools by grants in aid, particulars of which will be found in the tabular statement on page 121.

The Society's Dairy Steward (Mr. G. Gibbons) personally supervises all the Schools, and he and the Society's Secretary are responsible to the Agricultural Education Committee for the organising, financial, and clerical work connected with the Schools.

The nature of the instruction, the methods of procedure, and the appliances used at the Society's Schools, were described in very full detail in the last issue of the Society's 'Journal,' and have since been reprinted in the form of a pamphlet, which can be obtained of the Secretary, so that it is unnecessary to recapitulate these particulars.

The accompanying Tabular Statement (p. 127) shows the Schools which the Society conducted for County Councils during the past year.

THE FUTURE.

BUTTER AND CHEESE SCHOOLS.—The engagements which the Society has entered into with County Councils will keep its travelling Butter Schools employed for some time to come, and a Cheese School will be opened in April next at Butleigh, in Somersetshire. The site selected is Lower Rock Farm, which is occupied by Mr. H. Bethell, under R. Neville Grenville, Esq. The dairy is a very suitable one, and students will be able to board and lodge in the house attached. The Committee will again have the advantage of Miss Cannon's services as teacher, and of Mr. Cannon's co-operation and help in the supervision and general arrangements of the School.

With a view to the encouragement of students, special prizes for cheese and butter made by students who have attended any of the Society's Schools, are offered at the Society's Gloucester Meeting, which opens on May 31 next. There will also be Butter-making Competitions for students in the Showyard-dairy.

PROPOSED DAIRY COLLEGE.—The success of the Society's Dairy Schools, coupled with the generally-admitted want of some

Counties for which the Society has conducted Schools during 1892.

County.	Nature of School.	Schools began.	Schools terminated or proceeding.	Centres visited.	No. of Courses given.*	Grant voted by County Council.	Proportion of Grant already paid to Society.	Society's Receipts from Fees and Sales.	Society's Disbursements.
						£	£ s. d.	£ s. d.	£ s. d.
Somerset, 1891 ..	Butter ..	Apr. 15, 1891 ..	Mar. 31, 1892 ..	11	21	1,000	814 16 7	552 5 6	1,367 2 1
Surrey	Ditto. ..	Oct. 12, 1891 ..	Feb. 26, 1892 ..	7	9	500	500 0 0	..	443 10 6
Somerset, 1892 ..	Ditto. ..	Apr. 1, 1892 ..	Still proceeding ..	7	16	1,000	1,000 0 0	169 11 10	613 15 8
	Cheese ..	Apr. 1, 1892 ..	Oct. 31, 1892 ..	1	..			685 8 1	957 4 7
Kent	Butter ..	Mar. 7, 1892 ..	Still proceeding ..	11	17	1,000	750 0 0	..	735 15 6
Glamorgan ..	Ditto. ..	Mar. 22, 1892 ..	Aug. 1892	7	9	450	450 0 0	..	358 7 8
Dorset	Ditto. ..	Aug. 11, 1892 ..	Still proceeding ..	5	9	1,000	500 0 0	..	318 18 0
				49	81	4,950	4,014 16 7	1,407 5 5	4,824 14 0

* A course consists of ten days' instruction.

permanent institution where persons could be trained in Dɛ work, induced the Society's Council, on the recommendatioı its Agricultural Education Committee, to appoint, in Octo 1891, a Special Committee, to consider the feasibility of e blishing such an institution, mainly for the benefit of tl Counties which are included within the area of the Socie ordinary operations.

The Committee provisionally agreed upon the following m outlines of a scheme:—

TITLE.

BATH AND WEST AND SOUTHERN COUNTIES DAIRY TRAINING COLLEGI

OBJECTS.

1. To provide instruction of the highest class in—
   (a)—The practical details of Cheese and Butter Making.
   (b)—The science of Dairying in all its branches.

Under Section (a) it is intended to give Practical Instruction in Ch and Butter Making, as at present carried on in the Society's Schools.

Section (b) is more especially designed for Students who are desirou qualify themselves as Teachers of the theory, as well as the practic Dairying.

2. To carry on systematic investigations with reference to Milk anc products; and to conduct experiments with regard to the feeding of M Cattle, and Dairy Husbandry generally.

SITE.

It is suggested that a Site might be found by purchase or lease of s commodious Country House (in which Students would be boarded) stan in its own grounds with some land adjoining, conveniently situated suitable district, and within easy reach of a Railway Station.

SUBJECTS OF INSTRUCTION.

PRACTICAL.

Butter-making.	Cheese-making (various method

SCIENTIFIC.

Agricultural Chemistry.	Physiology.
Botany.	Veterinary Science.
Anatomy.	Book-keeping.

The Committee then placed themselves in communicat with the representative public bodies of the Counties referred in order to ascertain how far they could count upon their operation and support, but the response was not sufficieı encouraging to justify the Committee in proceeding further v the scheme at that time.

Since then the want of a Dairy Training College has b more generally realised, and the Society recently determine again invite the County Councils to unite with it in establish such an institution.

The Committee thought that possibly an obstacle to t

first scheme lay in the large extent of the area embraced by the Society's operations, and the distance that some Counties would consequently be from any site that might be selected. They have, therefore, divided the Society's area into the two following groups of Counties, and have suggested to the County Councils included in each that a College might be established for either one of these groups; while, if both groups were prepared to support the scheme, it might be possible to provide two such institutions, viz., one for each group of Counties. Failing the support of all the County Councils mentioned, a College, though necessarily on a smaller scale, might be established by the combination of, say, three or more Counties.

1st, or South Western, Group.	2nd, or Southern, Group.
Cornwall.	Oxon.
Devon.	Berks.
Somerset.	Hants.
Dorset.	Surrey.
Wilts.	Sussex.
Gloucestershire.	Kent.
Herefordshire.	
Worcestershire.	
Monmouthshire.	
South Wales.	

It is proposed that a County Council contributing financial support to the scheme shall have the privilege of nominating a certain number of students (in proportion to the amount of the grant) at a reduced rate of fees. The situation of the College would be decided hereafter by a Joint Committee representing the Councils joining in the scheme and the Society. It is expected that the Council of the County in which the College would be situated would, in consideration of the special advantages accruing therefrom, make an additional and substantial contribution to its funds. County Councils joining the scheme would, of course, be represented on the governing body.

The Committee have proposed that a Conference should be held of Representatives from all Counties disposed to join, and are now awaiting replies from the County Councils with whom they have communicated.

XI.—*Observations on Cheddar Cheese-making. Report for* 1892. By F. J. LLOYD, F.C.S., F.I.C.

IN the early part of 1892 I received instructions to conduct Observations at the Society's School at Axbridge, similar to those made in the autumn of 1891, and reported upon in the 'Journal' (vol. ii. p. 144).

I was requested to carry out the observations, so far as possible, on the same lines as in 1891, and also to endeavour to adopt the suggestions which were made at the conclusion of the report thereon. Permission was also given me to conduct such experiments as might be deemed desirable to further this object, even at the risk of diminishing the value of the cheeses produced. For convenience of reference the subject of this Report is treated under the following heads:—

1. The Conditions under which the Cheeses were made.
2. The Record of Observations.
3. The Bacteriological Investigation.
4. The Experimental Cheeses.
5. The Results of Observations.

I.—THE CONDITIONS UNDER WHICH THE CHEESES WERE MADE.

THE FARM AND SOILS.

The dairy of Compton House, Axbridge, is attached to the dwelling-house, and surrounded by farm buildings; it is not large, and there was no possibility of having two vats in use together. Moreover, as is well known, the yield of milk last season was small, hence it was not possible to act upon suggestion No. 4 of last year's Report.

The dairy faces south and west, and the atmosphere which entered into it would pass over buildings whichever way the wind blew.

The fields upon which the cows were pastured lay in the low level land, about one mile from the house. This land has evidently once been marsh land. It would appear to have been reclaimed from the sea some centuries ago,* and whether the herbage is distinct or not is a botanical question which I regret Professor Carruthers did not investigate, he, unfortunately, not being able to visit the farm.

To me the grass appeared of rough quality, and there seemed to be many useless plants in the pastures. The fields upon which the cows fed were as follows:—

Large Leaze	22 acres.
The 12 acres	12 „
The 10 acres	10 „
Sharnams, or the 7 and 8 acres	15 „
The 14 acres	14 „
Moor House Field	14 „
Botany Bay	6 „
The after Grass	15 „

* This I gather from a work entitled 'A General View of the Agriculture of the County of Somerset.' By Jno. Billingsley. 1798.

The nature of the land is best shown by the analyses and Report of Dr. Voelcker, to whom carefully mixed samples were sent for analysis.

REPORT OF DR. VOELCKER ON THE SOILS.

Analytical Laboratory,
22, Tudor Street,
New Bridge Street, London.
January 7th, 1893.

The results of analysis of the five soils taken in connection with the Bath and West and Southern Counties' Society's Experiments are as follows:—

Soil dried at 212° F. contain—	10 Acres.	14 Acres.	Moor House.	7 and 8 Acres.	Large Leaze.
*Organic matter and water of combination	13·99	15·67	15·23	15·60	17·98
Ferric oxide	2·60	3·81	3·78	4·02	3·81
Ferrous oxide	1·49	·94	·73	·66	1·09
Alumina	5·42	6·28	6·19	6·54	7·06
Lime	·87	1 01	·90	·90	1·03
Magnesia	1·17	1·50	1·10	1·27	1·30
Potash	·73	·71	·65	·85	·86
Soda	·37	·46	·87	·47	·66
Phosphoric acid	·19	·23	·22	·18	·22
Sulphuric acid	·10	·10	·11	·14	·14
Sulphur (as sulphides)	·04	·02	·02	·04	·02
Insoluble silicates and sand ..	73·03	69·27	70·20	69·33	65·83
	100·00	100·00	100·00	100·00	100·00
*Containing nitrogen	·60	·65	·69	·66	·75
Equal to ammonia	·73	·79	·83	·80	·91
Nitric acid	·0025	·0025	·003	·003	·0035
Chloride of sodium	·005	·005	·005	·005	·005

The samples sent were small in amount, the soils themselves being already nearly quite dry and in small lumps, so that I had no opportunity of seeing them as they occurred *in situ.* They contained a great deal of rootlets, which tended to show high results in organic (vegetable) matter and in nitrogen resulting therefrom.

The five different soils were very similar in appearance, being of a greyish-brown colour, and of the nature, I should say, of a clay loam.

The analytical results brought out the fact that all five soils were strikingly alike in general composition. Indeed, there is no one point that markedly distinguishes any one soil from another, and remarks made on the composition of one will apply almost equally to all.

I have noted on the high amounts of organic matter and nitrogen. Lime also is present in ample quantity in all, though there are no cases of the occurrence of the amounts found in the Frome soil (Vallis Farm) last year.

The soils further show richness in potash, and both in this respect and in that of the supply of phosphoric acid, all the soils are in good fertility.

The separate estimation of chlorides did not bring out any case in which any excess of salt was shown, such as occurred with one of the Frome soils last year.

On the other hand, I found a good deal of iron present in the ferrous and not merely in the ferric state, and consequently I estimated the amounts separately. Analysis also showed that sulphides (probably as pyrites) were present to a small degree.

These two last-named points would lead me to think that the soils were not in the best condition of cultivation possible, but that further aeration and opening of the soil would be beneficial. Whether they are effectually drained or not appears to me worthy of consideration. J. AUGUSTUS VOELCKER.

THE STOCK AND YIELD OF MILK.

On April 1st they began with 30 cows in milk. These had increased to 48 by May 25th, leaving 2 more to calve. Ten were heifers with their first calf. The cows were ordinary Shorthorns of no precise character. No especial care appeared to have been taken to breed good milkers, and no register or record of the milk of individual cows was kept.

The cows were on the pastures day and night during the whole period. They received a little cake in the early months, and also in the autumn.

The water supply to the cattle was by means of dykes or ditches, the water in which, owing to the dry season, ran at times very low. The water appeared to be of very varying composition, at times mainly surface drainage water, which is not, in my opinion, well adapted for cows in milk. Such water is, as a rule, deficient in lime, too soft in fact, and it is well known that, owing to the considerable amount of lime secreted by the cow in her milk, hard water is a desideratum.

The season was most unfavourable to the growth of grass, and the cows were, therefore, compelled to travel about and keep moving to get sufficient food. It is evident then that the conditions were such as to prohibit either the largest quantity or the best quality of milk being obtained. Though it is difficult to compare the milk of one herd with that of another, much less at a year's interval, and to say definitely what causes the difference, if any, between them, yet the following comparison, between the composition of the milk yielded at Frome in 1891,

and at Axbridge in 1892, during the three months, August, September, and October, is interesting:—

—	Average Composition of Milk.						
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.
Vallis Farm, Frome. Aug. 1891	87·39	12·61	3·87	2·76	·37	4·84	·77
Compton House Farm, Axbridge. Aug. 1892 ..	87·72	12·28	3·38	2·65	·37	5·20	·68
Vallis Farm, Frome. Sept. 1891	87·00	13·00	4·13	2·99	·41	4·69	·78
Compton House Farm, Axbridge. Sept. 1892 ..	87·44	12·56	3·57	2·87	·41	5·05	·66
Vallis Farm, Frome. Oct. 1891	86·19	13·81	4·75	3·21	·47	4·61	·77
Compton House Farm, Axbridge. Oct. 1892 ..	86·87	13·13	4·00	3·08	·51	4·84	·70

As it seemed probable that the difference first observed in August was due mainly to season, Mr. Armstrong, the occupier of Vallis Farm, was asked to send me samples of the mixed milk he was then obtaining, taken from his cheese tub at the same time as the samples were being taken at Axbridge. This he did in September, and again in October, and the results of the analyses of these samples are given in the following table side by side with the results obtained on the same days in 1891 at Vallis, and in 1892 at Axbridge:—

COMPOSITION OF MILK AT VALLIS AND AXBRIDGE COMPARED.

Date.	Vallis, 1891.			Vallis, 1892.			Axbridge, 1892.		
	Fat.	Casein, &c.	Solids.	Fat.	Casein, &c.	Solids.	Fat.	Casein, &c.	Solids.
Sept. 12	4·03	8·75	12·78	3·66	8·69	12·35	3·65	8·99	12·64
„ 13	4·07	8·73	12·80	4·02	8·70	12·72	3·55	8·97	12·52
„ 14	3·85	8·75	12·60	3·88	8·56	12·44	3·69	8·93	12·62
„ 15	3·98	9·06	12·84	3·96	8·76	12·72	3·57	8·87	12·44
„ 16	3·75	9·13	12·88	3·84	8·66	12·50	3·65	8·97	12·62
„ 19	4·06	9·00	13·06	3·85	8·71	12·56	3·45	9·07	12·52
Average	3·96	8·90	12·83	3·87	8·68	12·55	3·59	8·97	12·56
Oct. 20	4·84	9·10	13·94	4·16	9·02	13·18	3·88	9·16	13·04
„ 21	4·98	9·08	14·16	4·24	9·04	13·28	4·08	9·20	13·28
„ 24	5·07	9·07	14·14	4·05	9·05	13·19	4·08	9·20	13·28
„ 25	4·91	9·09	14·00	4·16	9·22	13·38	4·13	9·25	13·38
„ 26	5·05	9·09	14·14	4·52	9·06	13·58	4·01	9·25	13·26
„ 27	5·20	9·10	14·30	4·49	9·05	13·58	3·80	9·20	13·00
Average	5·01	9·09	14·11	4·27	9·07	13·36	3·99	9·21	13·21

It will be seen that the milk obtained at Vallis in 1892 poorer than in 1891, but was richer than that given at Axbr So the poorer quality of the milk yielded at Axbridge cann due solely to season, but is probably characteristic of the yielded by such pastures.

II.—The Record of Observations.

The tables drawn up in 1891 so fully covered the grou cheese-making that they were adopted last year with only slight addition: the volume of whey. The whey was coll in a tank which was roughly graduated to show the vol The figures are only approximate, however, for the tank wa fixed, and, though care was taken to have it always in the s position, slight variations may have occurred.

The tables also record the temperature of the dairy each Greater attention should be paid to the temperature of the d and cheese room than is at present by many cheese-makers evidence seems to point to the fact that temperature plays a in cheese-making even more important than is generally posed. It is, in my opinion, as necessary to have thermom permanently fixed in the dairy and cheese-room as it is to one in the actual operations of cheese-making.

The following tables give the results of the observations. the mass of figures is so great that their careful study is no task. To facilitate this, the average monthly results of s of the more important observations have been calculated inserted. Those who are interested in other figures not averaged can obtain these averages for themselves and fill the spaces left for them. For the more rapid consideratio the results a table of monthly averages is given on the opp page.

MONTHLY AVERAGES OF RESULTS OF OBSERVATIONS.

	3	5	6	7	9		10	11	13	14	15	19	20	23	25	27	34	34a	35	41–45	46	51	53	54	55	60
	Relating to Evening's Milk.								Morning's Milk.				Mixed Milk, &c.													
		At night.			In morning.																					
Month.	Volume of Milk.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Temp. of Dairy.		Temp. of Milk.	Acidity.	Volume.	Acidity.	Total Volume of Milk.	Acidity of Stale Whey.	Acidity.	Proportion of Rennet added.	Acidity of Whey before breaking.	Acidity of Whey put aside.	Acidity of Whey when drawn.	Volume of Whey.	Acidity of draining from pil'd Curd.	Acidity of draining from Curd before grinding.	Acidity of Curd when milled.	Weight of Curd when vatted.	Acidity of Liquid from press.	Weight of Cheese taken to cheese room.	Loss in Press.	Weight of Cheese when sold.
	galls.				min.	max.			galls.		galls.							galls.				lbs.		lbs.	lbs.	lbs.
April . .	37	55	81	·18	52	55	65	·19	44	·17	81	·34	·18	9031	·13	·14	·17	..	·22	·85	4·00	77	1·08	71½	5½	68
May . .	50	62	82	·21	60	64	67	·23	59	·20	109	·40	·22	9135	·16	·16	·20	..	·26	·92	5·24	110½	1·18	102	8½	94
June . .	60	64	87	·22	62	65	69	·23	67	·21	127	·44	·22	9403	·15	·16	·22	111	·32	·99	4·60	132	1·16	122	10	113
July . .	56	65	87	·21	63	66	69	·23	60	·21	116	·46	·22	9419	·15	·16	·21	97	·29	1·00	4·66	117	1·18	115	12	108
August .	47	66	87	·21	64	66	69	·23	53	·21	100	·45	·23	9423	·15	·16	·21	84	·30	·89	4·47	112	1·14	102½	9½	94
September	39	61	84	·21	60	62	68	23	45	·22	84	·44	·23	9302	·15	·16	·20	69	·26	·91	4·69	99	1·07	91	8	85
October .	26	66	76	·21	60	65	63	·22	32	·21	58	·41	·22	9041	·14	·15	·19	47	·24	·90	4·10	72	1·11	68	4	62

MONTHLY AVERAGES OF RESULTS OF ANALYSES.

Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
April . . .	88·25	11·75	3·06	2·35	·43	5·28	·66	7·00	·31	·54	42·04	57·96	28·82	2·54
May . . .	87·96	12·04	3·12	2·55	·40	5·25	·72	6·95	·38	·55	42·48	57·52	29·49	2·49
June . . .	87·80	12·20	3·17	2·65	·39	5·26	·73	6·91	·35	·55	41·14	58·86	29·39	2·46
July . . .	87·80	12·20	3·21	2·66	·39	5·22	·72	6·87	·34	·55	41·82	58·18	29·17	2·34
August . .	87·72	12·28	3·38	2·65	·37	5·20	·68	6 86	·32	·54	42·25	57·75	29·49	2·16
September .	87·44	12·56	3·57	2·87	·41	5·05	·66	6·78	·33	·53	42·17	57·83	29·49	2·14
October . .	86·87	13·13	4·00	3·08	·51	4·84	·70	6·89	·34	·55	41·66	58·34	30·06	2·25

RECORD OF OBSERVATIONS MADE AT THE BATH A

1	2	3	4	5	6	7	8	9		10	1
		RELATING TO EVENING'S MILK.									
			At Night.				In Morning.				
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.	Ac
		galls.	P.M.				A.M.	min.	max.		
8–9	Ten acres and Botany Bay .	36	6.4	61	83	·17	6.45	55	..	69	
9–10	Ditto . . .	37	6.8	61	88	·17	7.4	57	..	69	
10–11	Ditto . . .	35	5.15	62	89	·18	6.52	57	..	65	
11–12	Ditto . . .	38	7.5	61	84	·19	7.5	56	..	65	
12–13	Ditto . . .	38	6.20	59	84	·18	6.55	56	..	63	
13–14	Ditto . . .	34	6.10	54	77	·17	6.50	50	54	57	
14–15	Ditto . . .	39	6.15	51	79	·18	7.12	48	53	63	
15–16	Ditto . . .	34	5.8	53	82	·17	7.15	48	53	60	
16–17	Ditto . . .	38	6.5	50	78	·18	7.15	49	53	61	
17–18	Ditto . . .	35	5.15	52	79	·18	7.10	48	52	59	
18–19	Ditto . . .	36	6.20	53	79	·18	7.15	48	58	63	
19–20	Ditto . . .	38	6.10	52	76	·17	7.10	50	53	66	
20–21	Ditto . . .	38	6.15	53	82	·17	7.30	52	56	65	
21–22	Ditto . . .	37	6.20	54	83	·18	7.10	54	57	67	
22–23	Ditto . . .	37	6.12	54	82	·18	6.55	54	62	65	
23–24	Ditto . . .	37	6.15	55	79	·19	7.22	55	57	65	
24–25	Ditto . . .	35	5.15	55	82	·18	7.5	55	57	66	
25–26	Ditto . . .	39	6.30	54	81	·18	7.10	55	57	67	
26–27	Ditto . . .	39	6.20	53	80	·18	7.0	54	57	69	
27–28	Ditto . . .	40	6.21	54	80	·19	7 21	52	56	67	
28–29	Ditto . . .	37	6.15	53	81	·19	7.10	53	56	66	
29–30	Ditto . . .	38	6.30	54	80	·20	7.15	52	56	66	
	Average . . .	37	..	55	81	·18	..	52	55	65	

T OF ENGLAND SOCIETY'S CHEESE SCHOOL, APRIL, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
Morning's Milk.				Milk Heated.		Stale Whey.		Mixed Milk, &c.			
										Rennet added.	
ne of Field.	Volume of Milk.	Acidity.	Total Volume of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		galls.			A.M.	ounces.	
Moor .	40	·17	76	35	90	4	·24	·17	7.8	1·37	8876
o . .	41	·17	78	25	90	4	·33	·18	7.40	1·39	8978
o . .	44	·17	79	22	90	..	..	·18	7.45	1·40	9029
o . .	41	·18	79	43	90	..	..	·18	7.45	1·40	9029
o . .	41	·17	79	40	90	..	..	·17	7.45	1·40	9029
o . .	44	·17	78	34	90	..	..	·17	7.50	1·38	9043
o . .	45	·17	84	35	90	4	·25	·17	7.50	1·46	9205
o . .	47	·18	81	37	90	4	·33	·18	7.50	1·43	9063
o . .	43	·17	81	32	90	4	·35	·17	7.50	1·43	9063
o . .	46	·17	81	28	90	4	·33	·18	7.50	1·43	9063
o . .	45	·17	81	32	90	4	·36	·19	7.45	1·43	9063
o . .	43	·17	81	31	90	4	·33	·18	7.40	1·43	9063
o . .	43	·18	81	28	90	4	·28	·20	7.50	1·43	9063
o . .	45	·18	82	30	90	4	·30	·19	7.45	1·45	9048
o . .	48	·17	85	28	90	4	·35	·19	7.50	1·51	9007
o . .	47	·18	84	28	88	4	·38	·20	8.00	1·49	9020
o . .	49	·18	84	33	90	4	·38	·19	8 4	1·49	9020
acres Bo-ny Bay }	44	·18	83	35	90	4	·40	·18	7.45	1·47	9034
o . .	44	·18	83	30	90	4	·36	·19	7.50	1·48	8973
o . .	44	·20	84	33	90	4	·39	·21	7.57	1·49	9020
o . .	45	·18	82	31	90	4	·38	·19	7.55	1·46	8986
o . .	46	·18	84	31	90	4	·38	·20	7.45	1·49	9020
	44	·17	81	..	..	..	·34	·18	7.47	..	9031

RECORD OF OBSERVATIONS MADE AT THE BATH AND

	24	25	26	27	28	29	30	31	32	33	34
						Temp. of Scald.				RELATING TO W	
Day of Month.	Time when Curd cut.	Acidity of Whey before Breaking.	Time of Breaking.	Acidity of Whey put aside.	Time Scalding commences.	1st.	2nd.	Time taken in Stirring.	Time in Scald.	Temp. when drawn.	Acidity.
	A.M.		A.M.		A.M.			min.	h. m.		
8–9	8.0	·12	9.25	·12	10.15	88	90	60	2 10	86	·15
9–10	8.25	·13	8.45	·14	9.37	87	89	60	2 8	87	·15
10–11	8.50	·12	9.3	none	9.55	88	91	55	2 3	87	·17
11–12	8.43	·11	9.0	·12	9.57	88	90	60	2 7	86	·14
12–13	8.45	·11	9.0	·11	10.0	88	90	60	2 20	85	·12
13–14	8.50	·11	9.25	·11	10.15	88	90	60	2 9	84	·11
14–15	8.50	·12	9.15	·12	10.10	88	90	60	2 25	85	·16
15–16	8.50	·12	9.10	·14	10.10	88	90	35	1 30	87	·19
16–17	8.50	·12	9.10	·12	10.12	88	90	40	1 28	88	·16
17–18	8.45	·13	9.5	.13	10.5	88	91	30	1 30	87	·20
18–19	8.40	·13	9.0	·14	10.0	88	91	30	1 25	88	·18
19–20	8.40	·13	9.10	·14	10.5	88	91	60	2 2	87	·14
20–21	8.50	·13	9.20	·13	10.18	88	91	60	2 2	86	·16
21–22	8.40	·15	9.5	·15	10.0	88	90	60	2 0	85	·17
22–23	8.44	·14	9.0	·14	9.55	88	90	60	2 5	86	·20
23–24	8 45	·14	9.5	·14	10.0	88	91	60	2 35	87	·19
24–25	8.50	·14	9.5	·14	10.0	88	91	50	1 35	88	·18
25–26	8.35	·13	8.48	·14	9.40	88	91	63	1 55	86	·18
26–27	8.42	·14	9.5	·14	10.3	88	90	60	2 7	86	·21
27–28	8.45	·14	9.5	·15	10.5	88	90	40	1 40	86	·20
23–29	8.40	·14	8.55	·15	9.53	88	90	35	1 30	86	·19
29–30	8.30	·14	8.45	·15	9.38	88	91	40	2 0	86	·22
Average ..		·13	..	·14	..	..	..	52	1 56	..	·17

ENGLAND SOCIETY'S CHEESE SCHOOL, APRIL, 1892.—*contd.*

;	37	38	39	40	41	42	43	44	45	46	47	48	49	
			Acidity of Whey during Treatment of Curd.								Salt added.			
ie d dns d.	Time Curd is taken from Tub.	Temp. of Curd when taken from Tub.	When taken to Cooler.	After 1st Cutting.	After 2nd Cutting.	After 1st Turning.	After 2nd Turning.	After 3rd Turning.	After 4th Turning.	Acidity of curd when Milled.	Weight.	Percentage.	Temp. of Dairy.	
n.	P.M.										lbs. oz.		min.	max.
t	1.52	86	·21	·32	·42	·64	·69	..	..	..	1 10	2·20	62	..
)	12.35	86	·32	·44	·60	·76	·86	..	..	..	1 11	2·23	62	..
)	12.50	86	·47	·63	·81	·84	..	..	..	..	1 11	2·26	62	..
)	1.30	83	·36	·55	·62	·97	1·02	..	..	4·60	1 11	2·20	59	..
)	1.45	81	·19	·26	·46	·58	·74	..	..	6·00	1 11	2·18	52	63
5	1.50	84	·15	·24	·42	·63	·76	..	..	5·10	1 11	2·23	51	59
)	1.35	84	·54	·70	·82	·97	1·02	..	..	3·40	1 12	2·13	49	57
3	12.30	83	·51	·72	·89	·92	..	..	..	4·20	1 10	2·06	50	57
i	12.45	88	·39	·57	·78	·86	·96	..	..	{3·60 4·00}	1 10	2·04	49	57
	12.35	88	·44	·50	·80	·87	·98	..	..	3·80	1 10	2·14	48	60
	12.25	87	·26	·31	·40	·48	·56	·61	·79	3·60	1 10	2·11	50	57
	1.5	86	·16	·20	·31	·33	·55	..	..	6·20	1 10	2·14	51	59
	2.0	84	·23	·31	·44	·53	..	..	..	5·20	1 10	2·19	54	60
	1.45	86	·25	·32	·50	·50	..	..	..	5·80	1 10	2·10	54	62
	1.15	85	·30	·37	·52	·69	·83	..	..	5·60	1 12	2·19	55	62
	1.30	85	·27	·33	·52	·63	..	..	..	5·20	1 11	2·15	51	62
	12.50	88	·30	·39	·60	·73	·81	..	..	5·10	1 11	2·19	50	63
	1.5	86	·31	·51	·67	·87	·93	..	..	5·20	1 10	2·08	55	62
	1.35	86	·49	·67	·89	1·02	..	..	..	3·80	1 10	2·08	54	63
	12.45	87	·39	·52	·68	·88	·97	1·08	..	3·90	1 11	2·14	54	61
	12.30	83	·41	·54	·72	·81	·94	1·05	..	3·80	1 10	2·14	53	61
	12.25	87	·49	·66	·80	·92	·98	1·11	..	3·70	1 11	2·15	53	61
	1.10									4·00			54	60

RECORD OF OBSERVATIONS, APRIL, 1892.—*continued.*

	50	51	52	53	54	55	56		57		58		59	
	RELATING TO CURD.			RELATING TO CHEESES.										
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Temp. of Cheese Room.				Hygrometer Reading.			
							Morning.		Evening.		Morning.		Evening.	
							Min.	Max.	Min.	Max.	Wet.	Dry.	Wet.	Dry.
		lbs.	P.M.	per cent.	lbs.	lbs.								
8–9	71	74	6.55	1·06	65½	8½	..	..	..	..	..	..	..	..
9–10	72	75½	3.55	1·09	68	7½	..	..	..	..	..	..	..	..
10–11	72	74½	3.50	1·10	67½	7	..	..	..	..	59	62	56½	60
11–12	70	76½	6.28	1·14	70	6½	..	..	..	..	52	55½	57	61
12–13	60	77½	9.40	0·95	70½	7	..	..	50	52	51½	55	49	52
13–14	61	75½	9.47	0·97	69	6½	46	50	45	61	44½	46½	52	56
14–15	75	82	5.20	1·23	76½	5½	44	54	44	62	43	45	56½	62
15–16	72	79	3.25	1·15	74½	4½	44	61	44	57	44	66	52½	56½
16–17	67	79½	5.10	1·08	74	5½	46	59	45	50	45	47	48	50
17–18	66	76	5.10	1·09	71½	4½	44	48	42	56	43	45	49	52
18–19	65	77	9.30	1·06	72½	4½	50	55	54	59	50	52	53	57
19–20	63	76	A.M. 7.35	1·02	70	6	50	58	52	59	49	51½	54	56½
20–21	62	74½	A.M. 7.30	0·97	70	4½	50	64	52	65	53	55½	59½	62
21–22	63	77½	A.M. 7.30	1·00	71½	6	53	66	55	57	54	57	55	57
22–23	68	80	9.50	1·12	74	6	51	55	51	58	51	53	55	57
23–24	67	78½	9.55	1·07	74	4½	52	56	53	58	53	55	55	58
24–25	69	77	8.25	1·10	72	5	52	58	51	55	51	53	52	55
25–26	68	78	9.7	1·06	72	6	51	58	50	55	52	54	52	54
26–27	68	78	6.55	1·05	73	5	48	55	48	52	48	50	49½	52
27–28	68	79	6.22	1·11	75	4	47	50	46	60	47	49	52½	55
28–29	68	76	6.0	1·17	72½	3½	48	54	47	61	47	49	52	54
29–30	70	78½	5.6	1·15	73½	5	46	53	46	56	46	48	53	56
..	..	77	6.58	1·08	71½	5½	..	..	..	..	..	..	..	..

RECORD OF ANALYSES—APRIL, 1892.

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
8–9	88·20	11·80	2·97	2·41	·39	5·45	·58	6·76	·30	·44	43·35	56·65	27·54	2·60
9–10	88·12	11·88	3·16	2·39	·40	5·21	·72	7·10	·31	·59	43·35	56·65	27·56	3·05
10–11	88·46	11·54	2·84	2·42	·40	5·24	·64	6·94	·32	·52	43·20	56·80	21·66	..
11–12	88·04	11·96	3·19	2·00	·41	5·82	·54	7·02	·28	·50	42·05	57·95	28·68	2·55
12–13	88·08	11·92	3·18	2·12	·53	5·61	·68	7·06	·33	·49	42·15	57·85	29·15	2·60
13–14	88·24	11·76	3·06	2·38	·49	5·15	·68	7·04	·34	·51	42·90	57·10	27·61	2·80
14–15	88·14	11·86	3·13	2·80	·63	4·64	·66	7·06	·30	·48	41·65	58·35	30·12	2·50
15–16	88·10	11·90	3·22	..	..	..	·68	7·01	·30	·54	43·10	56·90	28·71	2·35
16–17	88·02	11·98	3·29	..	..	..	·66	7·10	·30	·56	42·45	57·55	29·37	2·40
17–18	88·52	11·48	2·81	..	..	..	·70	7·00	·32	·59	44·20	55·70	26·73	2·75
18–19	88·26	11·74	2·99	2·64	·40	5·05	·66	7·06	·26	·51	41·30	58·70	32·37	2·55
19–20	88·48	11·52	2·98	..	..	..	·64	7·05	·29	·55	40·50	59·50	29·76	2·60
20–21	88·32	11·68	3·02	..	..	..	·68	7·02	·41	·54	41·60	58·40	29·72	2·45
21–22	88·32	11·68	2·91	..	..	..	·68	6·92	·26	·52	41·35	58·65	28·86	2·45
22–23	88·32	11·68	3·10	..	..	..	·66	7·05	·39	·56	41·75	58·25	29·40	2·30
23–24	88·24	11·76	3·02	..	..	..	·66	7·04	·25	·56	41·20	58·80	28·86	2·40
24–25	88·40	11·60	3·03	..	..	..	·64	6·90	·38	·57	42·10	57·90	28·55	2·35
25–26	88·16	11·84	3·25	..	..	..	·68	7·05	·29	·56	40·75	59·25	30·00	2·55
26–27	88·26	11·74	3·13	2·42	·38	5·13	·68	6·98	·26	·55	41·10	58·90	30·26	2·50
27–28	88·40	11·60	2·95	2·42	·40	5·17	·66	6·94	·32	·55	41·70	58·30	29·40	2·55
28–29	88·16	11·84	3·21	2·23	·40	5·34	·66	6·98	·42	·59	41·85	58·15	29·75	2·60
29–30	88·22	11·78	3·04	2·01	·39	5·60	·74	6·99	·34	·56	41·25	58·75	30·08	2·50
Average	88·25	11·75	3·06	2·35	·43	5·28	·66	7·00	·31	·54	42·04	57·96	28·82	2·54

RECORD OF OBSERVATIONS MADE AT THE BATH AND

1	2	3	4	5	6	7	8	9		10
		Relating to Evening's Milk.								
			At Night.				In Morning.			
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.
		galls.	P.M.				A.M.	min.	max.	
30-1	Ten acres Botany Bay	39	6.20	54	83	·21	7.20	52	57	65
1-2	Ditto	39	5.30	54	79	·21	7.20	53	57	65
2-3	Moor House, 12 acres Large Leaze	39	6.10	64	79	·20	7.20	61	65	64
3-4	Ditto	45	6.20	62	80	·20	7.25	60	68	66
4-5	Ditto	45	7.0	65	79	·21	7.25	59	66	66
5-6	Ditto	47	6.35	64	78	·20	7.20	62	66	65
6-7	Ditto	49	6.25	64	85	·22	7·20	57	68	66
7-8	Ditto	47	6.15	59	82	·23	7.25	59	66	65
8-9	Ditto	45	5.20	64	84	·22	7.10	63	70	66
9-10	Ditto	46	7.30	66	84	·22	7.2	62	66	67
10-11	Ditto	48	6.20	64	87	·21	7.10	60	64	69
11-12	Sharman's	49	6.5	64	87	·22	7.20	60	64	69
12-13	Ditto	49	6.15	63	87	·22	7.3	61	64	68
13-14	Ditto	51	6.17	64	88	·21	7.20	61	63	67
14-15	Ditto	52	6.35	61	77	·22	7.15	60	63	65
15-16	Ditto	48	5.15	61	83	·22	7.20	58	61	65
16-17	Ditto	50	6.15	59	77	·22	7.15	58	68	65
17-18	Moor House, Large Leaze . . .	56	6.20	58	78	·21	7.20	58	60	64
18-19	Ditto	53	6.15	60	84	·22	7.20	58	61	66
19-20	Moor House, Large Leaze, 12 acres .	55	6.20	60	83	·21	7.20	58	62	66
20-21	Ditto	54	6.15	60	82	·23	7.10	58	61	65
21-22	Ditto	54	6.10	60	84	·22	7.20	58	60	66
22-23	Ditto	50	5.20	60	83	·22	7.7	60	62	66
23-24	Ditto	57	6.15	62	84	·21	7.0	60	64	69
24-25	Ditto	56	6.20	61	83	·22	7.10	62	64	70
25-26	Ditto	57	6.10	64	83	·22	7.5	63	66	70
26-27	Sharman's, Large Leaze . . .	55	6.20	65	85	·23	7.15	64	67	70
27-28	Ditto	59	6.15	65	84	·22	7.15	64	66	71
28-29	Ditto	57	6.25	65	82	·23	7.10	64	66	70
29-30	Ditto	55	5.15	66	83	·23	7.15	63	65	70
30-31	Ditto	60	6.30	66	87	·22	7.15	64	67	72
Average		50	..	62	82	·21	..	60	64	67

NGLAND SOCIETY'S CHEESE SCHOOL, MAY, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILKS, &c.			
										Rennet added.	
ame of Field.	Vol. of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		galls.			A.M.	ounces.	
acres Botany ay	45	·18	84	33	90	4	·39	·20	7.40	1·49	9024
o	46	·20	85	38	90	4	·38	·21	8.5	1·51	9007
r House, Large eaze, 12 acres .	50	·19	89	37	90	4	·35	·21	7.54	1·58	9012
o	52	·20	97	38	90	4	·35	·21	7.52	1·72	9023
o	54	·19	99	33	90	none	..	·21	7.45	1·76	9000
o	53	·18	100	33	90	4	·37	·21	7.57	1·77	9039
o	53	·20	102	43	90	4	·43	·22	7.45	1·81	9016
o	55	·20	102	33	90	4	·41	·22	7.50	1·81	9016
o	57	·21	102	33	90	4	·40	·22	8.45	1·81	9016
o	52	·21	98	35	90	4	·42	·22	7.42	1·74	9011
o	51	·20	99	38	90	4	·41	·22	7.32	1·76	9000
ge Leaze, Sharm's . . .	54	·21	103	36	90	4	·41	·22	7.32	1·79	9206
o	55	·21	104	40	90	none	..	·23	7.37	1·80	9244
o	51	·21	102	23	90	4	·39	·23	7.49	1·77	9220
o	60	·21	112	39	90	4	·43	·22	7.55	1·94	9231
o	61	·21	109	46	90	4	·43	·22	7.55	1·89	9227
o	62	·21	112	46	90	4	·33	·23	7.55	1·94	9231
r House, Large eaze . . .	60	·21	116	54	90	4	·40	·22	7.45	2·02	9188
o	63	·21	116	39	90	4	·44	·21	7.45	2·02	9188
o	62	·22	117	48	90	4	·43	·22	7.49	2·04	9171
r House, Large eaze, 12 acres .	61	·21	115	40	87	4	·41	·22	7.35	2·00	9200
o	64	·21	118	45	88	4	·43	·24	7.40	2·05	9209
o	66	·22	116	31	90	4	·39	·22	7.27	2·02	9188
o	61	·22	118	41	90	4	·33	·24	7.35	2·05	9209
o	63	·21	119	38	81	4	·44	·22	7.23	2·07	9198
o	64	·21	121	41	82	4	·45	·22	7.38	2·11	9175
rnam's, Large eaze . . .	66	·22	121	35	84	4	·41	·23	7.47	2·11	9175
o	64	·21	123	34	90	4	·46	·23	7.45	2·14	9196
o	66	·21	123	42	90	4	·44	·23	7.45	2·14	9196
o	73	·21	128	40	90	4	·39	·23	7.32	2·23	9183
. . . . .	65	·20	125	41	82	4	·44	·23	7.40	2·17	9216
	59	·20	109	..	..	..	·40	·22	7.46	..	9135

ORD OF OBSERVATIONS MADE AT THE BATH AND WE

of h.	24 Time when Curd cut.	25 Acidity of Whey before Breaking.	26 Time of Breaking.	27 Acidity of Whey put aside.	28 Time Scalding commences.	29 Temp. of Scald. 1st.	30 Temp. of Scald. 2nd.	31 Time taken in Stirring.	32 Time in Scald.	33 Relating to Whey. Temp. when drawn.	34 Relating to Whey. Acidity.	35 Acidity of drainings from piled Curd.
	A.M.		A.M.		A.M.			min.	h. m.			
	8.30	·14	8.45	·15	9.40	88	90	55	1 45	86	·20	·2[illegible]
	8.50	·14	9.5	·15	9.57	88	90	45	1 43	87	·18	·2[illegible]
	8.40	·14	9.0	·15	9.50	88	90	55	1 55	87	·18	·2[illegible]
	8.40	·15	8.57	·15	9.50	88	90	35	1 25	87	·17	·2[illegible]
	8.35	·14	9.7	·15	10.5	88	90	60	1 52	87	·18	·2[illegible]
	8.50	·16	9.25	·17	10.13	88	90	60	2 0	86	·25	·3[illegible]
	8.35	·16	8.55	·17	9.40	87	90	45	1 30	86	·19	[illegible]
	8.40	·15	9.7	·16	10.5	88	90	60	1 40	88	·19	[illegible]
	8.35	·16	9.3	·16	10.5	88	90	35	1 30	88	·19	[illegible]
0	8.30	·15	8.50	·16	9.54	88	90	45	1 36	86	·19	[illegible]
1	8.20	·15	8.50	·16	9.45	87	90	57	1 50	85	·22	[illegible]
2	8.15	·16	8.45	·16	9.40	88	90	52	1 45	86	·22	[illegible]
3	8.24	·15	8.57	·15	9.58	88	90	60	1 55	86	·18	·2[illegible]
4	8.34	·16	9.7	·17	10.5	88	90	60	1 50	86	·22	·3[illegible]
5	8.40	·17	9.0	·17	10.0	88	90	38	1 25	86	·19	·2[illegible]
6	8.40	·16	9.0	·16	10.4	87	90	60	1 55	85	·20	·2[illegible]
7	8.38	·15	9.10	·15	10.9	88	90	60	2 2	85	·17	·2[illegible]
8	8.33	·16	8.57	·17	9.57	88	90	45	1 43	86	·20	·3[illegible]
9	8.28	·16	8.55	·17	9.55	88	90	37	1 30	86	·20	·2[illegible]
0	8.35	·15	8.53	·16	9.55	88	90	60	1 50	85	·20	·2[illegible]
1	8.25	·15	8.43	·16	9.45	88	90	60	2 0	85	·21	·2[illegible]
2	8.25	·17	8.40	·17	9.40	88	90	40	1 30	86	·20	·2[illegible]
3	8.15	·16	8·38	·17	9.38	88	90	60	1 52	86	·19	·2[illegible]
4	8.20	·16	8.40	·16	9.40	88	90	60	1 45	86	·19	·2[illegible]
5	8.12	·17	8.37	·17	9.28	88	90	60	2 7	86	·21	·2[illegible]
6	8.25	·17	8.40	·17	9.44	88	90	60	1 51	87	·20	·2[illegible]
7	8.30	·16	8.51	·17	9.53	88	90	60	2 2	87	·22	·2[illegible]
8	8.30	·16	8.54	·18	9.55	88	90	60	2 5	87	·23	·3[illegible]
9	8.30	·16	8.53	·17	9.55	88	90	60	2 5	87	·21	·2[illegible]
0	8.17	·16	8.32	·17	9.35	88	90	60	1 45	87	·21	[illegible]
1	8·28	·16	8.40	·16	9.40	88	90	104	2 35	85	·25	[illegible]
verage ..		·16	..	·16	..	..	..	55	1 49	..	·20	[illegible]

IGLAND SOCIETY'S CHEESE SCHOOL, MAY, 1892—contd.

37	38	39	40	41	42	43	44	45	46	47	48	49	
Time Curd was taken from Tub.	Temp. of Curd when taken from Tub.	Acidity of Whey during Treatment of Curd.							Acidity of Curd when Milled.	Salt Added.		Temp. of Dairy.	
		When taken to Cooler.	After 1st Cutting.	After 2nd Cutting.	After 1st Turning.	After 2nd Turning.	After 3rd Turning.	After 4th Turning.		Weight.	Percentage.		
P.M.										lbs. oz.		min.	ma
12.20	88	·48	·63	·77	·88	1·00	1·14	..	5·00	1 11	2·16	54	6
1.10	86	·36	·44	·65	·76	·92	·96	..	6·40	1 11	2·16	54	6
12.50	86	·33	·42	·63	·76	·91	·93	..	6·00	1 12	2·13	62	6
12.35	87	·35	·48	·64	·83	·86	1·03	..	5·80	2 0	2·17	62	6
1.15	87	·24	·30	·45	·64	·81	..	..	5·00	2 1	2·16	59	6
1.0	86	·55	·71	·85	1·00	..	..	..	4·00	2 1	1·96	62	6
12.30	86	·33	·44	·60	·67	·80	·85	95	4·20	2 2	2·13	58	7
12.45	87	·33	·43	·60	·70	·93	·95	..	3·90	2 2	2·06	62	7
12.40	87	·32	·48	·67	·81	·90	·92	..	4·20	2 2	2·07	64	7
12.45	85	·33	·38	·54	·55	·58	·67	·72	4·20	2 0	2·06	61	6
12.40	85	·38	·45	·55	·67	·77	·86	..	4·80	2 1	2·10	61	6
12.45	85	·48	..	·76	·87	·90	..	..	4·80	2 2	2·02	61	6
1.5	85	·23	·32	·49	·68	·75	..	..	4·00	2 2	2·02	61	6
1.10	85	·57	·72	·86	·92	·99	..	..	6·80	2 1	1·80	61	6
12.37	87	·42	·59	·75	·82	·92	..	..	7·00	2 6	2·00	60	6
1.10	85	·37	·49	·66	·75	·88	·98	..	6·70	2 5	2·04	58	6
1.50	84	·31	·42	·57	·71	·77	..	..	5·40	2 6	2·02	58	6
1.10	88	·64	·82	1·05	1·11	..	..	..	5·20	2 8	1·99	59	6
12.40	87	·48	·67	·86	1·02	1·15	1·21	..	6·00	2 8	2·06	58	6
1.0	86	·41	·59	·77	·88	·97	1·08	..	5·10	2 8	2·06	59	6
12.40	84	·46	·65	·84	·99	1·08	..	..	5·20	2 8	2·07	58	6
12.35	86	·40	·49	·62	·74	·82	·89	..	6·00	2 9	2·17	60	6
1.25	86	·31	·34	·47	·54	·64	·85	..	4·80	2 8	2·14	60	6
1.40	86	·41	·54	·76	·85	·89	..	..	5·00	2 9	2·16	61	6
12.40	86	·37	·48	·64	·84	·92	·92	..	5·10	2 9	2·12	62	6
1.5	86	·31	·38	·51	·58	·65	..	..	5·20	2 10	2·14	63	6
1.25	85	·40	·51	·65	·71	..	..	..	5·60	2 10	2·09	64	6
1.0	85	·43	·54	·66	·77	·85	·94	..	4·80	2 11	2·09	64	7
1.25	87	·40	·58	·66	·78	..	..	..	5·00	2 11	2·11	64	6
12.20	85	·35	·48	·68	·81	·89	·95	..	5·30	2 11	2·07	64	6
1.25	86	·57	·62	·85	·91	·95	..	..	6·00	2 10	2·01	64	6
12.57	..	..	..	..	..	..	..	..	5·24	..	..	61	6

RECORD OF OBSERVATIONS, MAY, 1892—*continued.*

	50	51	52	53	54	55	56		57		58		59	
	Relating to Curd.			Relating to Cheeses.										
							Temp. of Cheese Room.				Hygrometer Reading.			
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of Liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Morning.		Evening.		Morning.		Evening.	
							Min.	Max.	Min.	Max.	Wet.	Dry.	Wet.	Dry.
		lbs.	P.M.	per cent.	lbs.	lbs.								
31–1	67	78	5.45	1·23	73	5	46	54	47	56	52	54	53	56
1–2	69	78	7.15	1·09	72	6	52	54	48	69	47	50	60½	65½
2–3	71	82	8.0	1·12	76½	5½	55	67	50	68	55	57	62	66
3–4	71	92	7.15	1·08	84	8	50	54	51	74	51	53	63	68
4–5	71	95½	9.50	1·17	90	5½	50	68	50	71	51	54	61	64
5–6	76	105	4.10	1·25	98	7	48	54	49	55	49	51	53	55
6–7	70	99½	7.35	1·23	96	3½	49	55	50	61	48½	51	57	59
7–8	73	103	8.10	1·16	95½	7½	49	58	53	62	53	55	58	61
8–9	74	102½	7.50	1·12	95	7½	53	60	53	64	52	55	60	63
9–10	71	97	9.57	1·32	90½	6½	57	63	57	66	55	58½	61½	64½
10–11	71	98	8.20	1·24	90	8	57	64	58	65	55	58	63	65
11–12	73	105	5.30	1·25	96½	8½	57	59	58	66	56	59	63	66
12–13	71	105	9.55	1·15	96	9	60	66	60	64	58	61½	61	63
13–14	72	114½	5.40	1·26	106	8½	61	67	60	64	66	63	60	63
14–15	73	118½	5.25	1·19	108	10½	57	63	57	58	56	59	57	59
15–16	69	113	8.35	1·24	105½	7½	54	58	54	60	56	58	56	59
16–17	70	117½	10.0	1·30	108½	9	54	58	53	59	55	57½	55	58
17–18	74	125½	4.40	1·18	112½	13	52	59	54	58	52½	55	56	58
18–19	72	121½	5.15	1·24	110	11½	54	56	54	60	54	56	58	61
19–20	71	121½	6.35	1·11	113	8½	56	60	56	60	56	58	57½	60
20–21	72	121	5.0	1·16	111½	9½	53	58	53	60	53	55	58	60
21–22	71	118	9.35	1·10	109	9	56	59	56	62	56	58	59	61
22–23	69	116½	A.M. 7.20	1·13	107	9½	58	60	54	61	58	60	54	57
23–24	73	118½	9.45	1·13	109	9½	58	63	53	60	59	62	58	60
24–25	73	120½	8.55	1·15	110	10½	60	64	54	65	60	62	58	61
25–26	74	122½	9.55	1·13	112	10½	61	67	52	63	61	63	60	63
26–27	76	126	8.45	1·22	113½	12½	62	66	53	62	63	65	56	59
27–28	76	128½	7.0	1·12	118	10½	63	66	63	68	63	65	64	66½
28–29	74	127	9.5	1·18	118	9	61	66	64	67	61	63	64	66
29–30	76	130	8.15	1·16	118½	11½	61	64	62	68	62	64	65	68
30–31	77	130½	5.35	1·17	119½	11	63	68	64	69	63	65	66	69
..	..	110½	7.31	1·18	102	8½	..	..	..	..	..	..	..	..

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
30–1	88·28	11·72	2·92	2·32	·40	5·40	·68	6·94	·36	·56	48·10	51·90	28·08	2·40
1–2	88·42	11·58	2·87	2·27	·42	5·34	·68	6·67	·34	·48	42·50	57·50	28·00	2·70
2–3	88·18	11·82	2·92	2·50	·42	5·28	·70	7·01	·34	·55	41·20	58·80	29·40	2·90
3–4	88·24	11·76	2·93	..	..	..	·74	6·82	·38	·54	41·20	58·80	27·39	2·55
4–5	88·28	11·72	2·82	..	..	..	·70	6·88	·34	·55	41·55	58·45	28·46	2·50
5–6	87·88	12·12	3·25	..	..	..	·70	6·96	·39	·55	42·70	57·30	28·35	2·25
6–7	87·98	12·02	3·17	..	..	..	·68	7·00	·37	·54	40·95	59·05	29·26	2·50
7–8	88·04	11·96	3·17	..	..	..	·72	6·86	·37	·55	41·45	58·55	28·74	2·60
8–9	88·22	11·78	2·87	2·50	·41	5·34	·66	6·93	·29	·55	41·40	58·60	27·81	2·50
9–10	88·02	11·98	3·06	2·50	·36	5·34	·72	6·82	·37	·56	41·90	58·10	29·37	2·45
10–11	88·42	11·58	2·70	..	..	..	·70	6·67	·31	·56	42·25	57·75	29·50	2·25
11–12	88·24	11·76	2·95	..	..	..	·74	6·93	·37	·56	41·25	58·75	30·59	2·25
12–13	87·98	12·02	3·03	..	..	..	·72	6·97	·36	·57	40·85	59·15	30·24	2·45
13–14	88·20	11·80	2·95	2·34	·40	5·35	·76	6·92	·43	·58	42·40	57·60	28·97	2·35
14–15	87·74	12·26	3·29	2·37	·40	5·46	·74	7·00	·42	·54	41·40	58·60	29·96	2·50
15–16	87·90	12·10	3·20	2·60	·40	5·18	·72	7·03	·39	·55	42·40	57·60	29·32	2·45
16–17	87·76	12·24	3·16	2·68	·42	5·28	·70	7·02	·41	·55	41·75	58·25	28·21	2·60
17–18	87·72	12·28	3·35	2·62	·40	5·17	·74	7·03	·32	·56	62·50	37·50	29·64	1·80
18–19	87·94	12·06	3·20	2·65	·40	5·07	·74	6·97	·34	·56	42·60	57·40	28·67	2·60
19–20	87·62	12·38	3·47	2·54	·41	5·22	·74	7·01	·41	·54	46·50	53·50	32·26	2·45
20–21	87·68	12·32	3·42	2·33	·39	5·50	·68	7·04	·48	·55	41·55	58·45	29·50	2·65
21–22	87·76	12·24	3·21	2·65	·40	5·24	·74	7·02	·37	·54	40·65	59·35	29·96	2·60
22–23	87·88	12·12	3·11	2·61	·40	5·28	·72	7·03	·43	·55	39·55	60·45	30·94	2·95
23–24	87·98	12·02	3·13	2·60	·41	5·18	·70	6·97	·44	·54	40·15	59·85	29·64	2·45
24–25	87·80	12·20	3·24	2·63	·42	5·15	·76	7·01	·40	·54	41·20	58·80	29·76	2·30
25–26	..	..	..	..	..	..	..	6·99	·34	·55	40·40	59·60	30·66	2·55
26–27	87·80	12·20	3·32	2·74	·41	4·99	·74	7·03	·36	·56	40·75	59·25	30·25	2·50
27–28	87·74	12·26	3·23	2·72	·41	5·14	·76	6·98	·42	·56	40·50	59·50	30·66	2·50
28–29	87·78	12·22	3·19	2·70	·41	5·20	·72	7·03	·37	·56	40·55	59·45	29·71	2·55
29–30	87·66	12·34	3·30	2·65	·38	5·25	·76	6·98	·41	·56	40·20	59·80	30·25	2·60
30–31	87·70	12·30	3·32	2·62	·39	5·23	·74	7·04	·42	·56	41·45	58·55	30·74	2·45
Average	87·96	12·04	3·12	2·55	·40	5·25	·72	6·95	·38	·55	42·48	57·52	29·49	2·49

RECORD OF OBSERVATIONS MADE AT THE BATH AND W

1	2	3	4	5	6	7	8	9		10
	RELATING TO EVENING'S MILK.									
			At Night.				In Morning.			
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.
		Galls.	P.M.				A.M.	min.	max.	
31-1	Sharnam's, Large Leaze	59	6.30	65	86	·22	7.10	64	68	70
1-2	Ditto	60	6.30	64	87	·22	..	..	..	..
2-3	Moor House, Large Leaze	..	..	..	..	..	7.15	62	66	70
3-4	Ditto	60	6.20	64	87	·23	7.15	61	64	68
4-5	Ditto	61	6.5	63	86	·23	7.20	61	63	69
5-6	Ditto	57	5.30	63	85	·21	6.45	61	65	68
6-7	Ditto	64	6.30	64	87	·21	7.5	63	64	70
7-8	Ditto	64	6.20	66	86	·22	7.10	64	67	73
8-9	Ditto	62	6.40	66	87	·21	7.10	65	68	73
9-10	Ditto, 12 acres. .	63	6.45	69	92	·23	7.10	66	70	74
10-11	Sharnam's Large Leaze	60	6.30	67	89	·22	7.20	65	70	72
11-12	Ditto	58	6.20	66	90	·22	7.20	65	68	70
12-13	Ditto	55	5.10	65	90	·23	7.15	63	66	68
13-14	Ditto	61	6.30	66	85	·23	7.7	63	66	69
14-15	Ditto	63	6.35	62	86	·22	7.0	61	65	70
15-16	Ditto	63	6.30	63	86	·22	7.7	62	64	69
16-17	Ditto	60	6.15	62	85	·23	6.40	61	64	67
17-18	Moor House, Large Leaze	63	6.35	62	87	·22	7.15	61	64	69
18-19	Ditto	58	6.30	64	86	·22	7.10	60	62	67
19-20	Large Leaze, 14 acres	54	5.45	62	82	·22	6.50	60	63	67
20-21	Ditto	58	6.30	63	84	·22	7.0	60	63	67
21-22	Ditto	66	6.15	63	83	·22	7.10	62	64	71
22-23	Ditto	62	6.10	64	90	·21	7.15	62	65	71
23-24	Ditto	59	6.30	63	87	·21	7.10	62	64	69
24-25	Ditto	60	6.45	64	87	·21	7.3	63	65	69
25-26	Moor House, Large Leaze	61	6.40	64	86	·21	7.30	63	65	70
26-27	Ditto	57	6.00	67	90	·21	7.15	64	67	71
27-28	Mixed Fields . .	60	6.30	66	91	·21	7.30	65	69	72
28-29	Ditto	57	6.20	65	90	·22	7.30	65	70	68
29-30	Ditto	57	6.30	64	90	·21	7.15	63	67	69
Average		60	..	64	87	·22	..	62	65	69

ENGLAND SOCIETY'S CHEESE SCHOOL, JUNE, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILKS, &c.			
										Rennet added.	
Name of Field.	Vol. of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		lbs.			A.M.	ounces.	
rnam's Large Leaze	64	·21	123	43	86	4	·48	·23	7.40	2·14	9196
to	67	..	127	..	..	..	..	..	7.38	2·18	9321
or House, Large Leaze	..	·20	126	40	89	4	·45	·23	7.35	2·14	9420
to	68	·21	128	40	90	4	·47	·22	7 40	2·17	9437
to	67	·21	128	39	91	4	·45	·22	7.45	2·17	9437
to	70	·21	127	43	85	4	·45	·23	7.10	2·16	9407
to	65	·21	129	41	84	4	·45	·22	7.43	2·19	9424
to	65	·22	129	40	81	4	·44	·23	7.25	2·19	9424
to	65	·22	127	39	79	4	·45	·24	7.27	2·16	9407
to, 12 acres . .	66	·22	129	31	79	none	..	·23	7.35	2·19	9424
rnam's Large Leaze	64	·21	124	28	90	4	·45	·22	7.48	2·11	9403
to	71	·22	129	30	84	4	·46	·24	7.55	2·19	9424
tto	73	·21	128	43	90	4	·44	·23	7.41	2·17	9437
tto	67	·22	128	45	90	4	·44	·23	7.40	2·17	9437
tto	67	·22	130	43	90	4	·44	·23	7.25	2·21	9411
tto	66	·21	129	36	90	4	·43	·23	7.33	2·19	9424
tto	69	·21	129	38	90	4	·46	·23	7.35	2·19	9424
or House, Large Leaze	65	·21	128	34	90	4	·46	·23	7.38	2·17	9437
tto	69	·21	127	34	88	4	·41	·22	7.41	2·15	9451
rge Leaze, 14 acres	72	·21	126	35	90	4	·42	·22	7.22	2·15	9376
tto	66	·21	124	30	90	4	·41	·22	7.47	2·11	9403
tto	69	21	135	27	90	4	·41	·22	7.40	2·28	9473
tto	69	·21	131	38	90	4	·42	·22	8.20	2·23	9399
tto	69	·21	128	32	88	4	·41	·22	7.35	2·17	9437
tto	64	·21	124	30	90	4	42	·21	7.33	2·11	9403
or House, Large Leaze	68	·21	129	33	90	4	·44	·22	7.52	2·21	9339
xed Fields . .	66	·20	123	30	86	4	·44	·22	7.40	2·12	9283
tto	65	·20	125	29	84	3	·46	·22	7.55	2·12	9434
tto	60	·20	117	24	90	4	·46	·22	7.45	1·99	9407
tto	63	·21	120	27	90	3	·46	·23	7.42	2·04	9411
	67	·21	127	..	..	..	·44	·22	7.39	..	9403

RD OF OBSERVATIONS MADE AT THE BATH AND WEST

24	25	26	27	28	29	30	31	32	33	34	34a	35
					Temp. of Scald.				Relating to Whey.			
Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Acidity of Whey put aside.	Time Scalding commences.	1st.	2nd.	Time taken in Stirring	Time in Scald.	Temp. when drawn.	Acidity.	Volume.	Acidity of draining from piled Curd.
A.M.		A.M.		A.M.			min.	h. m.			galls.	
8.22	·16	8.35	·17	9.40	88	90	75	2 5	87	·22	108	·29
..	..	..	..	..	..	..	..	..	..	..	..	..
8.22	·16	8.40	·17	9.35	88	90	60	2 5	86	·23	110	·33
8.25	·16	8.45	·16	9.40	88	90	60	2 5	87	·24	114	·53
8.30	·15	8.55	·16	9.50	88	90	60	2 20	87	·22	117	·33
7.55	·15	8.15	·15	9.10	88	90	60	2 15	86	·21	110	·30
8.30	·15	8.50	·16	9.50	88	90	60	2 20	86	·21	113	·28
8.10	·16	8.30	·17	9.31	88	90	60	1 51	87	·21	117	·27
8.14	·16	8.27	·17	9.30	88	90	60	2 0	87	·23	113	·30
8.15	·16	8.35	·16	9.32	88	90	60	2 8	86	·23	111	·34
8.32	·16	8.50	·17	9.44	88	90	60	1 53	87	·23	111	·32
8.40	·16	8.57	·18	9.52	88	90	60	1 48	86	·22	116	·30
8.26	·16	8.51	·18	9.51	88	90	60	2 9	85	·24	113	·34
8.27	·16	8.50	·17	9.51	87	90	60	2 9	82	·23	114	·35
8.12	·15	8.35	·16	9.35	88	90	60	2 0	84	·20	115	·24
8.21	·15	8.40	·16	9.45	88	90	60	1 45	87	·21	113	·26
8.20	·15	8.45	·15	9.49	88	95	90	2 35	89	·27	118	·43
8.35	·16	8.45	·16	9.40	88	90	60	2 0	86	·21	109	·26
8.35	·15	8.55	·16	10.0	88	90	60	1 52	86	·22	112	·28
8.20	·15	8.37	·16	9.33	88	90	60	2 7	86	·23	109	·29
8.45	·15	9.7	·16	10.5	88	90	60	1 50	86	·22	108	·27
8.25	·16	8.52	·17	9.47	88	90	47	1 37	86	·23	121	·30
9.12	·16	9.30	·17	10.25	88	90	60	1 50	85	·22	115	·28
8.30	·14	8.45	·15	9.40	88	90	60	2 0	87	·21	113	·27
8.20	·14	8.40	·15	9.40	88	90	71	2 13	88	·22	108	·32
8.45	·15	9.2	·15	10.7	88	94	20	2 8	92	·23	110	·45
8.30	·16	8.43	·17	9.45	88	90	45	1 31	88	·25	107	·35
8.40	·15	9.00	·17	10.0	88	90	47	1 35	87	·23	106	·34
8.35	·15	8.55	·15	9.57	89	90	45	1 41	86	·23	103	·34
8.30	·15	8.55	·16	9.54	88	90	45	1 43	87	·22	101	·33
ıge .	·15	..	·16	..	..	..	56	1 59	..	·22	111	·32

ENGLAND SOCIETY'S CHEESE SCHOOL, JUNE, 1892—*contd.*

37	38	39	40	41	42	43	44	45	46	47	48	49	
Time Curd was taken from Tub.	Temp. of Curd when taken from Tub.	Acidity of Whey during Treatment of Curd.							Acidity of Curd when milled.	Salt Added.		Temp. of Dairy.	
		When taken to Cooler.	After 1st Cutting.	After 2nd Cutting.	After 1st Turning.	After 2nd Turning.	After 3rd Turning.	After 4th Turning.		Weight.	Percentage.		
										lbs. oz.		min.	max.
12.50	85	·41	·50	·70	·81	·92	..	..	6·20	2 10	2·15	64	67
..	..	..	..	..	..	..	..	..	..	..	..	..	..
12.50	87	·50	·64	·80	·86	·92	1·01	..	7·20	2 9	1·94	62	65
12.55	88	·53	·65	·80	·84	·92	·97	..	4·00	2 11	1·99	61	64
1.20	86	·52	·67	·82	·89	·91	..	..	5·60	2 11	2·05	61	64
12.25	87	·47	·60	·73	·84	·88	·96	..	4·90	2 10	2·01	62	66
1.30	85	·42	·50	·62	·73	·80	·82	..	5·00	2 12	2·06	64	67
12.35	86	·38	·50	·71	·86	·90	·97	..	4·20	2 12	2·08	64	67
12.40	86	·46	·60	·74	·81	·88	·94	..	7·10	2 11	2·05	66	72
12.40	87	·45	·69	·87	·91	·96	..	..	6·30	2 12	2·05	67	72
12.35	87	·53	·68	·82	·91	·96	..	..	4·00	2 10	2·02	66	69
12.50	86	·49	·64	·80	·88	·95	1·04	..	4·40	2 12	2·04	65	67
1.5	86	·46	·60	·75	·89	·98	..	..	5·20	2 12	2·13	63	66
12.55	84	·55	·75	·97	1·09	..	..	..	3·90	2 12	2·02	62	65
1.00	87	·41	·61	·80	·94	1·05	..	..	6·40	2 13	2·07	62	64
12.35	87	·42	·58	·77	·89	·97	1·08	..	5·20	2 12	2·03	62	64
1.15	89	·63	·79	·90	1·01	..	..	..	4·00	2 12	2·07	61	64
12.50	85	·40	·58	·78	·95	1·00	..	..	3·60	2 12	2·03	61	62
12.50	85	·43	·56	·76	·87	·97	1·08	..	{3·90 / 3·80}	2 11	2·07	61	64
12.45	86	·45	·69	·79	·87	1·01	1·09	..	5·09	2 11	2·05	61	64
1.0	86	·41	·51	·68	·76	·94	1·01	..	3·90	2 10	2·06	62	65
12.25	86	·39	·53	·64	·75	·83	1·03	1·06	4·20	2 15	2·11	62	66
1.30	88	·44	·57	·71	·78	·89	·95	..	6·00	2 14	2·13	63	65
12.50	86	·42	·54	·68	·80	·86	·96	1·00	{4·30 / 4·30}	2 13	2·11	63	66
1.5	88	·54	·65	·78	·89	·93	1·00	..	5·30	2 11	2·05	63	66
1.2	87	·57	·67	·85	·83	·96	..	..	..	2 12	2·08	63	67
12.15	88	·57	·71	·80	·92	·99	..	..	4·30	2 10	2·03	66	69
12.55	87	·56	·67	·82	·89	·93	..	..	4·00	2 11	2·09	66	70
12.40	87	·60	·74	·88	·93	..	..	..	4·20	2 8	1·99	66	68
12.35	88	·54	·69	·83	·93	..	..	..	4·00	2 10	1·97	64	67
12.51	..	..	..	..	..	..	..	..	4·60			63	66

RECORD OF OBSERVATIONS, JUNE, 1892—*continued.*

	50	51	52	53	54	55	56		57		58		59	
	RELATING TO CURD.			RELATING TO CHEESES.										
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Temp. of Cheese Room.				Hygrometer Readings.			
							Morning.		Evening.		Morning.		Evening.	
							Min.	Max.	Min.	Max.	Wet.	Dry.	Wet.	Dry.
		lbs.	P.M.		lbs.	lbs.								
31-1	74	128	6.55	1·14	118½	9½	63	68	63	64	62	64	62	64
1-2	..	..	..	..	119	..	..	..	..	..	..	..	..	..
2-3	74	132½	5.37	1·21	122	10½	57	63	58	62	58	59½	60	63
3-4	73	135½	6.0	1·21	127	8½	56	61	53	60	56	58	58	60
4-5	74	131	5.45	1·16	121½	9½	58	59	58	61	57	59	60	62
5-6	75	130½	5.25	1·18	120	10½	58	61	58	64	58	60	63	65
6-7	75	133	9.0	1·18	122	11	60	64	57	62	61	63	59	62
7-8	75	132	8.50	1·15	119½	12½	62	67	58	67	61	63	59	63
8-9	77	130½	7.15	1·24	120	10½	62	67	66	74	62	64	70	73
9-10	78	134	4.40	1·18	121	13	67	72	68	74	66	70	71	74
10-11	77	129½	4.55	1·20	118	11½	66	74	66	68	65	67	66	70
11-12	73	134½	6.0	1·20	123½	11	64	68	64	64	63	65	63	65
12-13	74	135	5.30	1·15	125	10	58	64	58	63	58	61	61	64
13-14	77	136	4.10	1·10	127½	8½	58	62	58	62	57	59	60	62½
14-15	74	135½	5.50	1·09	126	9½	53	61	56	61	55	58	59	62
15-16	74	135½	5.45	1·18	125	10½	57	61	58	59	57	59	58	60
16-17	76	132½	4.40	1·14	125	7½	56	58	57	58	56	57½	56	58
17-18	73	135½	5.50	1·13	125½	10	54	59	55	60	55	57	58	61
18-19	72	129½	6.0	1·14	121	8½	54	60	57	62	57	59	58½	61
19-20	73	131	5.25	1·16	121½	9½	56	60	54	63	56	58	59	62
20-21	72	127	6.30	1·16	117½	9½	56	60	57	59	57	59	59	61
21-22	72	139	6.30	1·19	127½	11½	58	60	59	64	58	60	62	64
22-23	73	134½	7.10	1·18	125½	9	60	63	60	62	61	63	60½	62½
23-24	73	133	6.50	1·17	124	9	59	61	57	64	59	61	62½	64
24-25	76	131	6.0	1·14	120	11	60	63	60	64	60	62	62	64
25-26	77	132	5.0	1·13	121	11	61	63	61	66	60½	62	65	67
26-27	78	129	4.0	1·19	117	12	64	66	64	69	63½	65	68	70
27-28	78	135	5.10	1·22	123	12	64	69	62	67	65	67	63	65
28-29	77	125½	4.0	1·16	116	9½	64	69	63	67	65	67	65	67
29-30	76	133	3.50	1·13	121	12	61	66	62	65	62	64	62	64
..	..	132	5.37	1·16	122	10	..	..	..	..	..	..	..	..

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
31–1	87·70	12·30	3·26	2·54	·39	5·30	·72	7·02	·34	·55	39·15	60·85	32·17	2·55
1–2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2–3	87·62	12·38	3·43	2·59	·41	5·21	·74	6·98	·43	·56	41·00	59·00	31·05	2·50
3–4	87·58	12·42	3·35	2·57	·40	5·33	·76	6·98	·36	·56	41·25	58·75	30·37	2·55
4–5	87·76	12·24	3·16	2·55	·39	5·40	·74	6·92	·34	·55	41·55	58·45	29·78	2·60
5–6	87·62	12·38	3·30	2·57	·40	5·39	·72	6·81	·37	·56	40·65	59·35	30·25	2·60
6–7	87·80	12·20	3·13	2·57	·37	5·41	·72	6·84	·40	·56	40·00	60·00	30·47	2·40
7–8	88·08	11·92	3·01	2·78	·38	5·07	·68	6·88	·38	·56	41·25	58·75	29·97	2·40
8–9	87·96	12·04	2·96	2·72	·37	5·23	·76	6·95	·30	·55	41·65	58·35	28·60	2·40
9–10	87·80	12·20	3·09	2·88	·36	5·15	·72	6·90	·27	·57	40·85	59·15	30·97	2·40
10–11	87·60	12·40	3·35	2·77	·37	5·17	·74	6·95	·38	·55	41·85	58·15	29·27	2·40
11–12	87·62	12·38	3·39	2·73	·40	5·12	·74	6·98	·36	·56	41·50	58·50	29·51	2·45
12–13	87·58	12·42	3·36	2·78	·42	5·12	·74	6·97	·37	·57	39·75	60·25	30·94	2·45
13–14	87·64	12·36	3·31	2·69	·39	5·23	·74	7·02	·36	·55	41·60	58·40	29·22	2·40
14–15	87·50	12·50	3·40	2·56	·40	5·38	·76	6·94	·39	·55	41·45	58·55	29·81	2·55
15–16	87·82	12·18	3·16	2·61	·41	5·28	·72	6·89	·26	·56	42·45	57·55	28·08	2·45
16–17	87·96	12·04	3·05	2·56	·39	5·28	·76	6·82	·41	·57	40·80	59·20	29·90	2·45
17–18	87·50	12·50	3·45	2·62	·39	5·32	·72	6·93	·40	·55	41·40	58·60	28·88	2·50
18–19	87·82	12·18	3·13	2·61	·41	5·29	·74	6·91	·34	·53	41·60	58·40	28·18	2·45
19–20	87·96	12·04	3·02	2·50	·40	5·40	·72	6·72	·38	·55	42·40	57·60	28·21	2·35
20–21	87·76	12·24	3·14	2·68	·38	5·28	·76	6·91	·27	·55	42·15	57·85	28·47	2·50
21–22	87·86	12·14	3·08	2·66	·38	5·28	·74	6·97	·29	·56	40·85	59·15	29·35	2·35
22–23	87·98	12·02	3·07	2·62	·39	5·26	·68	7·01	·32	·57	40·85	59·15	29·16	2·45
23–24	88·08	11·92	3·01	2·74	·40	5·03	·74	6·87	·40	·55	41·20	58·80	30·01	2·50
24–25	87·82	12·18	3·18	2·69	·38	5·21	·72	6·91	·32	·54	41·00	59·00	29·40	2·45
25–26	87·96	12·04	3·15	2·69	·41	5·09	·70	6·82	·31	·55	..	..	..	..
26–27	88·24	11·76	2·72	2·70	·40	5·18	·76	6·92	·35	·56	41·10	58·90	29·02	2·40
27–28	87·88	12·12	3·00	2·63	·39	5·40	·70	6·89	·33	·55	40·50	59·50	29·90	2·50
28–29	87·80	12·20	3·15	2·63	·38	5·30	·74	6·94	·33	·55	41·55	58·45	28·09	2·40
29–30	87·96	12·04	3·07	2·64	·40	5·21	·72	6·97	·35	·56	40·65	59·35	29·54	2·45
Average	87·80	12·20	3·17	2·65	·39	5·26	·73	6·91	·35	·55	41·14	58·86	29·59	2·46

RECORD OF OBSERVATIONS MADE AT THE BATH AND WE

1	2	3	4	5	6	7	8	9		10	
	RELATING TO EVENING'S MILK.										
			At Night.				In Morning.				
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.	Aci
		galls.	P.M.				A.M.	min.	max.		
30–1	Mixed Fields . .	59	6.20	63	89	·21	7.15	63	66	68	
1–2	Ditto	60	6.30	64	88	·22	7.10	64	68	70	
2–3	Ditto	58	6.20	66	89	·21	7.23	65	68	71	
3–4	Ditto	49	6.0	68	91	·21	7.5	65	70	70	
4–5	Ditto	56	6.50	66	88	·20	7.35	65	69	69	
5–6	Ditto	57	7.5	64	87	·21	7.15	64	67	73	
6–7	Ditto	58	6.30	65	86	·21	7.20	63	66	68	
7–8	Ditto	56	7.5	64	87	·22	7.5	62	67	66	
8–9	Ditto	56	6.25	64	88	·21	7.20	63	66	68	
9–10	Ditto	56	6.50	65	87	·20	7.35	62	66	68	
10–11	Ditto	51	5.15	66	89	·21	7.10	63	66	68	
11–12	Ditto	57	7.0	66	88	·20	7.15	63	67	69	
12–13	Ditto	59	7.5	66	89	·21	7.20	63	66	71	
13–14	Ditto	57	7.15	64	85	·21	7.30	63	65	69	
14–15	Ditto	58	6.55	65	86	·21	7.30	63	66	70	
15–16	Ditto	57	7.0	65	89	·21	7.30	64	66	70	
16–17	Ditto	56	6.50	65	85	·20	7.30	63	66	69	
17–18	Ditto	52	5.25	63	85	·22	7.30	62	65	67	
18–19	Sharnam's Large Leaze . . .	57	6.55	64	83	·21	7.10	62	65	68	
19–20	Ditto	54	6.45	62	85	·21	7.30	61	64	66	
[illegible]	Ditto	56	7.5	63	87	·20	7.20	61	65	67	
[illegible]	Ditto	55	6.45	63	88	·21	7.15	61	65	66	
[illegible]	Ditto	56	8.15	64	85	·21	7.25	62	64	69	
[illegible]	Ditto	58	6.50	66	91	·22	7.25	63	65	70	
[illegible]	Ditto	50	5.50	67	89	·21	7.25	63	68	68	
[illegible]	Moor House, Large Leaze . . .	55	7.5	65	88	·20	6.50	63	66	67	
[illegible]	Ditto	55	6.50	65	87	·21	7.10	63	66	69	
[illegible]	Ditto	57	6.55	65	86	·21	7.30	64	68	68	
[illegible]	Ditto	56	6.45	67	89	·22	6.40	63	70	69	
[illegible]	Ditto	53	6.45	66	88	·22	7.25	64	67	69	
[illegible]	Ditto	55	6.40	67	87	·21	7.5	64	68	70	
		..	..	65	87	·21	..	63	66	69	

F ENGLAND SOCIETY'S CHEESE SCHOOL, JULY, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILK, &c.			
ame of Field.	Vol. of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Rennet Added. Vol.	Rennet Added. Proportion by Volume.
	galls.		galls.	galls.					A.M.	ounces.	
ed Fields . .	61	·20	120	30	90	4	·46	·22	7.53	2·04	9411
o	59	·20	119	27	94	4	·47	·23	7.37	2·01	9472
o	61	·21	119	26	84	3	·48	·23	7.50	2·01	9472
o	64	·20	113	22	90	3	·48	·22	7.26	1·92	9416
o	56	·21	112	18	90	3	·47	·23	7.38	1·90	9431
o	61	·21	118	22	90	3	·48	·22	7.31	2·08	9077
o	57	·21	115	32	90	4	·45	·22	7.40	1·95	9436
o	60	·21	116	31	90	4	·46	·22	7.50	1·97	9421
o	60	·21	116	22	90	4	·46	·22	7.48	1·97	9421
o	60	·21	116	30	90	4	·48	·22	7.55	1·97	9421
o	65	·20	115	30	84	none	..	·22	7.36	1·95	9436
o	58	·20	115	35	90	none	..	·21	7.50	1·95	9436
o	62	·20	121	30	91	none	..	·21	7.43	2·05	9443
o	60	·20	117	31	90	4	·44	·22	7.49	1·99	9407
o	61	·20	119	29	90	none	..	·22	7.45	2·02	9425
o	62	·20	119	28	90	4	·45	·22	7.46	2·02	9425
o	63	·20	119	37	90	4	·43	·23	7.56	2·02	9425
o	66	·20	118	33	85	3	·46	·22	7.45	2·00	9440
e Leaze, Sharm's . . .	60	·20	117	34	90	none	..	·21	7.42	1·98	9454
. . . . .	62	·20	116	49	90	4	·46	·22	8.0	1·95	9518
. . . . .	60	·20	116	44	87	4	·45	·22	7.55	1·95	9518
. . . . .	60	·21	115	33	90	4	·45	·22	7.40	1·95	9436
. . . . .	58	·21	114	36	88	2	·47	·21	7.45	1·94	9402
. . . . .	58	·22	116	32	90	1	·49	·23	7.45	1·97	9421
. . . . .	61	·21	111	39	90	2	·48	·23	7.48	1·89	9396
House, Large aze . . .	60	·22	115	44	91	2	·47	·23	7.48	1·95	9436
. . . . .	57	·22	112	39	90	2	·49	·24	7.44	1·91	9385
. . . . .	61	·21	118	40	90	2	·48	·24	7.55	2·00	9440
. . . . .	59	·22	115	37	91	2	·49	·23	7.44	1·95	9436
. . . . .	60	·21	113	34	90	none	..	·22	7.42	1·93	9367
. . . . .	58	·21	113	44	86	none	..	·23	7.47	1·93	9367
	60	·21	116	..	..	..	·46	·22	7.46	..	9419

RECORD OF OBSERVATIONS MADE AT THE BATH AND W

	24	25	26	27	28	29	30	31	32	33	34	34a
Day of Month.	Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Acidity of Whey put aside.	Time scalding commences.	Temp. of Scalding. 1st	2nd	Time taken in stirring.	Time in Scald.	Relating to Whey. Temp. when drawn.	Acidity.	Volume.
	A.M.		A.M.		A.M.			min.	h. m.			galls.
30–1	8.40	·16	9.6	·16	10.10	88	90	42	1 35	86	·22	101
1–2	8.24	·16	8.45	·16	9.44	88	90	45	1 36	87	·23	101
2–3	8.40	·16	8.57	·16	9.59	88	90	38	1 31	88	·22	100
3–4	8.18	·15	8.42	·16	9.35	88	90	50	1 35	87	·22	98
4–5	8.25	·15	8.43	·16	9.42	88	90	33	1 20	88	·20	93
5–6	8.25	·15	8.50	·15	9.41	88	90	60	1 49	87	·22	98
6–7	8.27	·14	8.53	·15	9.50	88	90	45	1 40	87	·24	93
7–8	8.35	·15	9.0	·16	10.0	88	90	30	1 21	88	·21	97
8–9	8.40	·15	9.7	·16	9.58	88	90	30	1 27	88	·22	98
9–10	8.55	·14	9.15	·15	10.12	88	90	60	1 48	87	·20	98
10–11	8.45	·14	9.22	·15	10.20	88	90	60	1 59	88	·17	95
11–12	8.57	·13	9.35	·14	10.37	88	90	60	2 13	87	·15	90
12–13	8.40	·14	9.15	·15	10.23	88	90	55	1 47	88	·19	99
13–14	8.45	·16	9.15	·17	10.5	88	90	30	1 20	88	·24	97
14–15	8.25	·14	9.10	·15	10.9	88	90	30	1 31	88	·18	97
15–16	8.48	·14	9.15	·14	10.13	88	90	60	1 47	87	·21	98
16–17	8.41	·15	9.10	·17	10.10	88	90	30	1 25	88	·25	98
17–18	8.30	·15	8.57	·16	10.0	88	90	30	1 25	88	·22	100
18–19	8.51	·16	9.35	·16	11.15	100	100	5	45	96	·22	92
19–20	8.50	·15	9.15	·16	10.15	88	90	30	1 15	88	·20	98
20–21	8.40	·15	9.5	·16	10.3	88	90	30	1 19	88	·23	101
21–22	8.25	·16	8.43	·17	9.45	88	90	30	1 22	87	·22	101
22–23	8.30	·15	9.0	·16	9.55	88	90	30	1 15	87	·20	97
23–24	8.37	·16	8.55	·17	9.53	88	90	30	1 18	87	·20	95
24–25	8.35	·16	9.5	·17	10.4	88	90	30	1 11	87	·21	92
25–26	8.35	·16	9·0	·16	10.3	88	90	30	1 17	87	·20	97
26–27	8.30	·17	8.45	·17	9.38	88	90	30	1 17	88	·21	97
27–28	8.42	·15	9.8	·15	10.3	88	90	30	1 17	88	·21	100
28–29	8.30	·15	8.50	·16	9.48	88	90	30	1 21	88	·23	98
29–30	8.30	·14	8.54	·15	9.55	88	90	45	1 35	88	·18	94
30–31	8.45	·16	9.7	·16	10.15	89	100	5	30	97	·17	94
Average..		·15	..	·16	..	..	..	37	1 29	..	·21	97

ENGLAND'S SOCIETY'S CHEESE SCHOOL, JULY, 1892—*continued.*

37	38	39	40	41	42	43	44	45	46	47		48	49	
Time Curd was taken from Tub.	Temp. of Curd when taken from Tub.	Acidity of Whey during Treatment of Curd.							Acidity of Curd when milled.	Salt Added.			Temp. of Dairy.	
		When taken to Cooler.	After 1st cutting.	After 2nd cutting.	After 1st Turning.	After 2nd Turning.	After 3rd Turning.	After 4th Turning.		Weight.		Percentage.		
P.M.										lbs.	oz.		min.	max.
12.30	88	·50	·68	·86	·88	·96	..	..	4·60	2	10	1·99	64	67
12.30	88	·61	·69	·90	·92	1·06	..	..	4·40	2	9	2.03	64	69
12.30	88	·55	·68	·85	·92	1·00	..	..	5·20	2	9	1·99	66	70
12.10	88	·55	·72	·86	1·01	..	..	..	6·10	2	9	2·12	66	70
12.10	88	·47	·62	·76	·84	·96	·94	..	4·00	2	8	2·09	66	68
12.25	86	·48	·66	·83	·98	..	..	..	5·10	2	10	2·07	66	68
12.47	88	·69	·84	1·03	..	..	..	..	6·20	2	9	2·02	64	67
12.20	88	·55	·71	(·85)	(·95)	(·97)	..	..	{4·00 4·80}	1 1	5 5}	2·02	62	67
12.25	88	·57	·72	·92	1·01	..	..	..	5·00	2	9	2·02	63	67
1.10	88	·43	·52	·69	·80	·89	·93	..	4·00	2	9	2·09	63	67
2.20	87	·45	·69	·79	·94	..	..	..	3·80	2	9	2·08	64	68
2.45	86	·27	·44	·58	·67	·80	..	..	4·20	2	9	2·11	64	67
1.25	88	·47	·67	·85	·98	..	..	..	3·80	2	11	2·07	64	67
12.25	87	·64	·77	·90	1·04	..	..	..	5·10	2	10	2·05	64	66
1.10	87	·44	·56	·70	·80	·83	·90	·98	4·00	2	9	2·03	64	67
1.36	87	·38	·50	·74	·86	1·01	..	..	6·20	2	9	1·99	64	67
12.25	88	·61	·89	1·06	..	..	..	..	{5·20 5 30}	2	11	2·07	64	66
12.25	89	·63	·87	1·11	..	..	..	..	5·40	2	11	2·06	63	66
12.35	97	·53	·68	·80	·92	..	..	..	4·30	2	10	2·18	62	66
12.25	88	·60	·82	·98	..	..	..	..	6·20	2	10	1·97	61	65
12.20	89	·63	·89	1·08	..	..	..	..	4·90	2	9	1·95	61	65
12.0	89	·61	·91	1·10	..	..	..	..	3·80	2	9	1·98	61	67
12.5	87	·52	·85	1·04	..	..	..	..	5·20	2	9	2·02	62	68
12.25	88	·44	·66	·90	1·07	..	..	..	5·00	2	9	2·02	65	68
12.35	88	·61	·87	1·10	..	..	..	..	4·20	2	8	1·98	64	66
12.23	88	·49	·74	1·00	..	..	..	..	3·80	2	9	2·02	63	67
11.55	88	·47	·71	·90	1·05	..	..	..	5·80	2	8	2·02	63	67
12.45	88	·60	·83	1·05	..	..	..	..	5·00	2	10	1·99	64	68
12.10	89	·61	·76	·92	1·00	..	..	..	4·60	2	9	2·02	63	68
12.50	89	·47	·69	·86	1·03	..	..	..	4·80	2	8	2·04	64	67
11.50	95	·25	·32	·42	·53	·80	·83	..	3·60	2	8	2·05	64	69
12.38	..	..	..	..	..	..	..	..	4·66	..		..	64	67

RECORD OF OBSERVATIONS MADE, JULY, 1892—*continued*

	50	51	52	53	54	55	56		57		58		59	
	Relating to Curd.			Relating to Cheeses.										
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of Liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Temp. of Cheese Room.				Hygrometer Reading.			
							Morning.		Evening.		Morning.		Evening.	
							Min.	Max.	Min.	Max.	Wet.	Dry.	Wet.	Dry.
		lbs.	P.M.		lbs.	lbs.								
30–1	76	131½	5.0	1·28	119	12½	62	66	63	65	62	64	63	65
1–2	76	126	4.30	1·28	113	13	59	65	62	69	60	62	67	69
2–3	78	128½	4.35	1·17	117	11½	65	69	66	72	65	67	68	72
3–4	77	121	3.40	1·16	109	12	67	71	64	68	65	68	65	67
4–5	74	119½	4.50	1·13	109½	10	64	71	61	66	64	67	62	64
5–6	76	127	4.0	1·14	115½	11½	63	68	62	68	64	66	63	65
6–7	77	127	3.35	1·18	114	13	61	64	62	65	61½	63	62	64
7–8	{ 79 { 75	64½ 65	2.35 4.30	1·06 1·26	58½ 60½	6 } 4½ }	60	63	60	66	60	62	63	65½
8–9	76	127	4.30	1·24	115½	11½	61	65	61	64	61	64	63	65
9–10	74	122½	8.20	1·12	114	8½	61	64	61	66	61	63	65	67
10–11	76	123	7.45	1·14	112	11	61	66	62	64	61	63	61	63
11–12	74	121½	9.45	·93	110	11½	62	67	63	65	63	65	63	65
12–13	76	130	5.30	1·19	118	12	62	64	61	64	61½	63	62	64
13–14	75	128	4.0	1·20	117	11	60	62	60	64	60	62	63	65
14–15	73	126	10.5	1·11	116	10	62	64	62	64	62	64	62	64
15–16	75	128½	10.2	1·19	116½	12	62	65	61	63	62	64	61	63
16–17	77	130	3.15	1·18	120	10	62	66	61	63	62	64	62	63
17–18	76	134	3.15	1·20	120½	13½	60	62	62	65	61	62	62	64
18–19	76	124½	3.55	1·15	113	11½	58	61	58	59	58	60	59	60
19–20	77	133	3.25	1·20	118½	14½	57	59	60	66	58	59	62	64
20–21	76	131½	3.15	1·20	119	15½	56	60	58	62	58	59	60	62
21–22	77	129	3.0	1·22	115½	13½	57	63	59	66	59	61	64	66
22–23	77	127	3.10	1·25	113½	13½	62	64	63	68	62	64	64	66
23–24	77	127½	4.25	1·16	113½	14	63	68	62	69	64	66	63	65
24–25	77	126	3.40	1·16	111½	14½	64	68	63	68	63	65	66	68
25–26	76	128	3.30	1·18	116½	11½	63	67	63	66	62	64	65	67
26–27	77	123½	3.35	1·21	111½	12½	63	66	63	67	63	65	65	67
27–28	78	131½	3.45	1·19	117½	14	63	67	62	69	62	64	66	68
28–29	77	127½	3.50	1·26	117	10½	63	68	63	68	62	64	66	68
29–30	78	122½	4.40	1·24	111	11½	63	67	64	69	63	65	65	67
30–31	76	122	8.40	1·03	110½	11½	63	68	66	68	64	66	66	67½
..	..	127	4.53	1·18	115	12	..	..	..	..	..	..	..	..

RECORD OF ANALYSES, JULY, 1892.

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
30–1	88·02	11·98	3·00	2·60	·39	5·25	·74	6·92	·31	·55	40·55	59·45	28·99	2·50
1–2	87·90	12·10	3·16	2·64	·39	5·17	·74	6·85	·33	·56	41·50	58·50	28·75	2·45
2–3	88·06	11·94	2·98	2·64	·40	5·16	·76	6·89	·32	·55	40·80	59·20	28·60	2·50
3–4	88·08	11·92	2·99	2·66	·41	5·14	·72	6·97	·32	·54	41·60	58·40	27·54	2·35
4–5	87·88	12·12	3·13	2·66	·40	5·19	·74	6·96	·34	·56	41·45	58·55	28·35	2·45
5–6	87·88	12·12	3·21	2·59	·39	5·19	·74	6·92	·33	·56	41·80	58·20	28·12	2·50
6–7	87·94	12·06	3·18	2·68	·39	5·05	·76	6·87	·37	·57	43·30	56·70	28·89	2·15
7–8	87·80	12·20	3·22	2·61	·38	5·31	·68	6·83	·38	·52	41·40	58·60	30·09	2·35
8–9	87·76	12·26	3·29	2·59	·39	5·31	·68	6·76	·30	·59	41·45	58·55	29·25	2·20
9–10	87·88	12·12	3·17	2·69	·38	5·20	·68	6·68	·34	·56	41·10	58·90	30·29	2·30
10–11	87·82	12·18	3·05	2·71	·39	5·29	·74	6·81	·38	·54	42·50	57·50	29·01	2·35
11–12	87·92	12·08	3·08	2·60	·40	5·24	·76	6·83	·30	·55	41·60	58·40	28·92	2·50
12–13	87·76	12·24	3·37	2·63	·38	5·20	·66	6·78	·31	·56	42·05	57·95	30·21	2·30
13–14	87·68	12·32	3·19	2·71	·38	5·34	·70	6·84	·32	·57	43·50	56·50	28·14	2·05
14–15	87·78	12·22	3·22	2·71	·40	5·13	·76	6·84	·33	·56	41·25	58·75	30·24	2·35
15–16	87·64	12·36	3·31	2·57	·39	5·35	·74	6·89	·38	·56	41·10	58·90	30·34	2·35
16–17	87·72	12·28	3·18	2·65	·40	5·33	·72	6·93	·34	·55	43·50	56·50	28·09	2·15
17–18	87·88	12·12	3·21	2·70	·40	5·07	·74	6·84	·32	·56	42·95	57·05	29·54	2·30
18–19	87·70	12·30	3·32	2·94	·39	4·93	·72	6·83	·34	·54	42·10	57·90	28·87	2·35
19–20	87·68	12·32	3·28	2·84	·38	5·12	·70	6·87	·38	·55	41·95	58·05	29 12	2·35
20–21	87·64	12·36	3·33	2·60	·40	5·31	·72	6·81	·37	·56	42·10	57·90	29·40	2·40
21–22	87·80	12·20	3·18	2·68	·38	5·24	·72	6·79	·34	·55	42·00	58·00	28·88	2·45
22–23	87·72	12·28	3·25	2 66	·39	5·22	·76	6·93	·35	·55	42·30	57·70	28 87	2·35
23–24	87·88	12·12	3·11	2·33	·39	5·59	·70	6·90	·36	·56	41·80	58·20	28·98	2·40
24–25	87·78	12·22	3·20	2·68	·39	5·21	·74	6·90	·33	·57	40 80	59·20	29·02	2·40
25–26	87·48	12·52	3·55	2·64	·40	5·19	·74	6·95	·33	·54	42 45	57·55	29·40	2·15
26–27	87·68	12·32	3·34	2·58	·39	5·25	·76	6·83	·38	·54	42·00	58·00	28·35	2·25
27–28	87·76	12·24	3·27	2·74	·40	5·09	·74	6·90	·30	·56	41·50	58·50	30·10	2·35
28–29	87·70	12·30	3·28	2·68	·41	5·25	·68	6·93	·39	·56	41·15	58·85	30·10	2·35
29–30	87·76	12·24	3·21	2·70	·39	5·26	·68	6·97	·37	·56	41·10	58·90	29·83	2·50
30–31	87·84	12·16	3·23	2·73	·38	5·12	·70	6·88	·32	·55	41·90	58·10	30·10	2·25
Average	87·80	12·20	3·21	2·66	·39	5·22	·72	6·87	·34	·55	41·82	58·18	29·17	2·34

RECORD OF OBSERVATIONS MADE AT THE BATH AND

1	2	3	4	5	6	7	8	9		10
		Relating to Evening's Milk.								
			At Night.				In Morning.			
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.
		galls.	P.M.				A.M.	min.	max.	
31–1	Moor House, Large Leaze . . .	49	5.30	67	88	·22	7.5	65	67	69
1–2	Ditto	52	6.40	67	89	·22	6.45	65	68	69
2–3	Ditto	51	6.30	66	89	·21	6.35	65	67	69
3–4	Ditto	52	6.20	65	86	·22	6.40	64	68	69
4–5	Ditto	52	6.40	66	87	·21	6.25	62	67	67
5–6	Ditto	48	6.15	65	88	·22	7.25	64	67	68
6–7	Ditto	49	6.25	65	85	·22	7.30	64	68	68
7–8	Ditto	45	5.25	66	89	·22	6.45	64	66	68
8–9	Ditto	48	6.35	66	88	·21	7.5	64	67	70
9–10	Ditto	50	6.45	65	87	·21	6.50	63	67	67
10–11	Ditto	45	6.40	64	88	·20	6.20	62	66	67
11–12	Ditto	50	6.45	64	88	·21	7.30	63	67	68
12–13	Ditto	48	6.40	65	89	·21	6.0	64	68	69
13–14	Large Leaze, Sharnam's . . .	48	7.0	65	87	·21	7.14	64	65	69
14–15	Ditto	43	5.50	66	83	·23	7.7	64	66	66
15–16	Ditto	52	7.30	66	84	·22	7.15	63	66	69
16–17	Ditto	48	6.55	66	87	·20	7.25	65	66	69
17–18	Ditto	54	7.15	67	89	·21	7.10	66	68	71
18–19	Moor House, Large Leaze . . .	48	7.45	67	88	·22	7.0	65	67	70
19–20	Ditto	44	6.30	67	86	·21	7.0	64	67	68
20–21	Ditto	48	7.20	65	85	·20	6.45	64	67	69
21–22	Ditto	42	5.20	69	91	·21	6.55	64	69	68
22–23	Ditto	48	6.30	67	92	·22	7.10	65	68	71
23–24	Ditto	46	6.22	67	91	·21	7.15	66	70	70
24–25	Ditto	45	6.45	67	90	·22	7.15	65	68	68
25–26	Ditto	43	6.15	65	91	·22	6.55	64	66	67
26–27	Ditto	43	6.55	64	89	·21	7.35	64	65	68
27–28	Ditto	42	6.50	65	88	·21	7.30	63	65	66
28–29	Ditto	38	5.45	64	82	·20	7.30	64	65	66
29–30	Ditto	45	7.0	66	85	·20	7.8	64	66	71
30–31	Sharnam's Large Leaze . . .	42	6.50	64	83	·21	7.20	62	64	68
Average		47	..	66	87	·21	..	64	66	69

ENGLAND SOCIETY'S CHEESE SCHOOL, AUGUST, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILK, &c.			
										Rennet Added.	
Name of Field.	Vol. of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		galls.			A.M.	ounces.	
r House, Large Leaze	63	·22	112	34	88	none	..	·23	7.40	1·92	9333
o	59	·21	111	43	86	none	..	·23	7.49	1·89	9396
o	58	·21	109	40	83	1	·46	·22	7.45	1·85	9427
o	59	·20	111	40	86	2	·47	·23	7.45	1·89	9396
o	59	·21	111	40	86	2	·47	·22	7.45	1·89	9396
o	60	·21	108	38	86	2	·48	·22	7.55	1·84	9391
o	56	·21	105	31	83	2	·49	·22	8.0	1·78	9438
o	61	·21	106	36	84	2	·47	·23	7.42	1·80	9422
o	57	·21	105	33	90	2	·48	·22	7.55	1·78	9438
o	54	·20	104	37	87	2	·46	·23	7.36	1·76	9454
o	59	·20	104	37	83	2	·46	·23	7.40	1·77	9401
o	56	·20	106	34	88	2	·48	·23	7.49	1·80	9422
o	54	·21	102	37	90	2	·47	·22	7.50	1·73	9433
ge Leaze, Sharnam's	55	·21	103	34	90	2	·46	·22	7.48	1·75	9417
o	58	·21	101	33	86	2	·47	·23	7.35	1·71	9450
o	48	·21	100	37	90	2	·48	·22	7.49	1·70	9411
o	52	·21	100	36	88	none	..	·22	7.48	1·70	9411
o	45	·21	99	36	84	none	..	·22	7.34	1·68	9428
r House, Large Leaze	53	·22	101	37	84	2	·49	·22	7.47	1·71	9450
o	52	·21	96	33	88	none	..	·22	7.53	1·63	9423
o	50	·20	98	36	88	2	·46	·23	7.47	1·65	9503
o	53	·21	95	33	85	2	·49	·23	7.27	1·61	9441
o	49	·22	97	32	83	2	·48	·23	7.35	1·63	9521
o	50	·22	96	28	86	1	·46	·22	7.45	1·63	9423
o	48	·20	93	30	90	2	·26	·23	7.32	1·58	9417
o	48	·21	91	28	90	2	·43	·22	7.43	1·54	9454
o	50	·20	93	28	90	2	·45	·23	7.45	1·57	9477
o	49	·20	91	33	90	2	·26	·22	7.57	1·54	9454
o	49	·21	87	27	92	none	..	·23	7.50	1·48	9405
o	44	·21	89	26	86	2	·37	·24	7.50	1·50	9493
rnam's Large Leaze	48	·21	90	31	90	2	·36	24	7.50	1·53	9411
.. ..	53	·21	100	..	..	..	·45	·23	7.45	..	9423

RECORD OF OBSERVATIONS MADE AT THE BATH AND WES

	24	25	26	27	28	29	30	31	32	33	34	34a	35
						Temp. of Scald.				Relating to Whey.			
Day of Month.	Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Acidity of Whey put aside.	Time Scalding commences.	1st	2nd	Time taken in stirring.	Time in Scald.	Temp. when drawn.	Acidity.	Volume.	Acidit of drainin from piled Curd.
	A.M.		A.M.		A.M.			min.	h. m.			galls.	
31–1	8.30	·15	9.0	·16	10.0	88	90	45	1 35	88	·18	88	·21
1–2	8.35	·15	9.10	·16	10.7	88	90	60	1 43	87	·19	92	·23
2–3	8.35	·14	9.3	·15	10·3	88	90	60	1 57	88	·20	90	·30
3–4	8.30	·15	8.50	·16	9.45	88	90	30	1 15	88	·22	90	·31
4–5	8.37	·15	9.2	·15	10.6	88	90	30	1 20	87	·20	93	·28
5–6	8.40	·15	9.14	·16	10.10	88	90	30	1 20	88	·22	91	·33
6–7	8.53	·15	9.20	·16	10.20	88	90	30	1 20	88	·22	88	·32
7–8	8.27	·16	8.53	·17	9.50	88	90	30	1 20	88	·24	89	·34
8–9	8.40	·16	9.15	·16	10.15	88	90	30	1 17	88	·22	87	·30
9–10	8.21	·16	8.47	·16	9.44	88	90	40	1 33	89	·21	88	·29
10–11	8.25	·15	8.55	·16	9.57	88	90	30	1 18	88	·23	87	·33
11–12	8.38	·15	9.11	·16	10.0	88	90	30	1 20	87	·21	88	·32
12–13	8.35	·15	9.5	·16	10.0	88	90	30	1 20	87	·22	87	·30
13–14	8.35	·15	9.0	·17	9.50	88	90	60	1 50	86	·26	90	·38
14–15	8.22	·15	8.52	·16	10.23	90	101	5	40	98	·24	90	·38
15–16	8.35	·15	9.10	·16	10.12	88	90	30	1 18	87	·23	88	·31
16–17	8.35	·15	9.5	·15	10.5	90	100	5	46	97	·17	87	·19
17–18	8.34	·15	9.10	·16	10.4	88	90	75	2 0	86	·20	81	·24
18–19	8.35	·16	9.5	·17	10.5	88	90	40	1 30	87	·24	90	·34
19–20	9.5	·15	9.40	·15	10.30	89	100	15	55	97	·15	81	·16
20–21	8.33	·15	9.0	·17	9.57	88	90	30	1 24	88	·21	87	·28
21–22	8.20	·16	8.35	·17	9.30	88	90	30	1 18	88	·27	78	·45
22–23	8.18	·17	8.40	·18	9.30	88	90	20	1 3	87	·26	84	·36
23–24	8.35	·15	9.10	·15	10.5	88	90	30	1 20	87	·21	81	·27
24–25	8.20	·16	8.40	16	9.28	88	90	30	1 20	87	·19	75	·22
25–26	8.38	·15	9.3	·16	9.55	88	90	35	1 20	87	·19	77	·29
26–27	8.30	·15	9.0	·16	9.52	88	90	30	1 21	87	·18	77	·23
27–28	8.50	·14	9.13	·16	10.10	88	90	35	1 20	87	·19	75	·22
28–29	8.48	·14	9.15	·15	10.0	88	91	45	1 30	87	·18	71	·20
29–30	8.43	·17	8.50	·18	9.40	88	90	30	1 15	87	·21	72	·27
30–31	8.35	·16	8.50	·18	9.43	88	90	60	2 27	86	·25	75	·45
Average	..	·15	..	·16	..	..	..	37	1 23	..	·21	84	·30

ENGLAND'S SOCIETY'S CHEESE SCHOOL, AUGUST, 1892—*contd.*

37	38	39	40	41	42	43	44	45	46	47		48	49	
		Acidity of Whey during Treatment of Curd.								Salt Added.				
Time Curd was taken from tub.	Temp. of Curd when taken from tub.	When taken to Cooler.	After 1st cutting.	After 2nd cutting.	After 1st turning.	After 2nd turning.	After 3rd turning.	After 4th turning.	Acidity of Curd when milled.	Weight.		Percentage.	Temp. of Dairy.	
P.M.										lbs.	oz.		min.	max.
12.45	88	·30	·43	·60	·79	·84	..	..	5·00	2	8	2·08	65	69
1.0	87	·38	·56	·80	·90	..	..	..	5·40	2	8	1·95	65	68
1.5	88	·54	·76	·96	..	..	..	..	4·40	2	7	2·04	65	68
12.0	89	·56	·82	1·00	..	..	..	..	4·00	2	8	1·99	64	68
12.47	89	·60	·83	1·00	..	..	..	..	6·20	2	8	1·95	62	67
12.50	89	·67	·90	·97	..	..	..	..	4·60	2	7	2·03	64	67
12.45	89	·53	·71	·90	1·00	..	..	..	4·80	2	6	2·05	65	68
12.5	88	·54	·75	·91	1·01	..	..	..	5·80	2	6	2·07	64	68
12.50	89	·59	·68	·90	·94	..	..	..	4·00	2	6	2·05	64	68
12.30	88	·53	·66	·90	1·00	..	..	..	4·20	2	5	1·97	63	66
12.40	88	·67	·85	1·05	..	..	..	..	4·20	2	5	1·99	62	66
12.45	89	·70	·85	1·06	..	..	..	..	3·80	2	6	2·01	64	67
12.15	89	·54	·72	·96	..	..	..	..	5·20	2	4	1·98	64	67
12.30	88	·62	·77	·94	..	..	..	..	5·00	2	4	1·96	64	68
12.10	98	·61	·65	..	..	..	..	..	5·80	2	3	2·00	63	69
12.45	90	·63	·77	..	..	..	..	..	4·60	2	4	1·93	64	68
12.0	98	·33	·43	·54	·64	..	..	..	6·0	2	3	2·02	65	70
1.10	86	·41	·57	·79	..	..	..	..	6·4	2	3	1·98	66	69
12.50	89	·74	·90	..	..	..	..	..	..	2	4	2·01	64	69
12.50	96	·29	·37	·50	·60	..	..	..	..	2	2	1·97	64	69
11.25	88	·51	·69	·89	..	..	..	..	5·30	2	3	1·99	64	70
11.45	89	·68	·80	·93	..	..	..	..	6·20	2	2	1·94	64	70
11.30	89	·56	·70	·85	·90	..	..	..	4·40	2	3	2·03	66	70
12.45	88	·55	·72	·87	..	..	..	..	4·20	2	3	2·03	66	70
12.8	87	·42	·55	·73	·83	..	..	..	5·60	2	1	1·96	66	68
12.25	89	·59	·75	·96	..	..	..	..	4·60	2	1	1·99	64	68
12.45	88	·49	·66	·80	·93	..	..	..	4·40	2	1	1·96	65	68
12.45	87	·38	·49	·67	·76	·81	..	..	5·00	2	0	1·92	63	67
12.58	87	·30	·41	·57	·76	·81	..	..	1·20	1	15	2·02	64	68
12.5	89	·43	·53	·68	·73	·84	..	..	4·80	2	1	2·05	64	67
12.55	88	·66	·82	..	..	..	..	..	3·80	2	0	1·90	62	65
12.31	..	..	..	..	..	..	..	..	4·47	..		..	64	69

RECORD OF OBSERVATIONS, AUGUST, 1892—*continued.*

	50	51	52	53	54	55	56		57		58		59	
	Relating to Curd.			Relating to Cheeses.										
							Temp. of Cheese Room.				Hygrometer Reading.			
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of Liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Morning.		Evening.		Morning.		Evening.	
							Min	Max.	Min.	Max.	Wet.	Dry.	Wet.	Dry.
		lbs.	P.M.		lbs.	lbs.								
31–1	75	120	8.50	1·18	109	11	64	66	66	70	64	66	69	70
1–2	77	124½	5.15	1·14	112	12½	65	69	65	69	65	67	67	69
2–3	78	119½	3.45	1·18	108½	11	64	68	65	67	65	66	66	67
3–4	79	125½	2.45	1·13	112	13½	64	66	64	68	64	66	66	68
4–5	77	124½	3.50	1·15	112	12½	62	67	62	69	62	63½	67	68
5–6	76	120	3.35	1·14	109½	10½	64	67	64	68	64	66	66	68
6–7	76	116	4.25	1·18	105½	10½	65	67	65	67	66	67	67	68
7–8	77	114½	3.55	1·21	105	9½	64	67	66	69	64	65½	68	69
8–9	76	116	4.15	1·19	106	10	64	66	64	68	64	65½	65	67
9–10	73	117	4.25	1·19	106	11	59	64	58	64	60	61	59½	60½
10–11	76	116	3.55	1·22	105½	10½	59	62	58	65	64	65	66	67
11–12	77	118	3.40	1·21	107	11	60	64	61	67	61½	62½	67	68
12–13	77	113½	3.20	1·12	102½	11	63	67	63	66	63	65	65	66
13–14	77	114½	3.20	1·16	107	7½	63	64	62	66	63	64	66	67
14–15	73	109	4.40	1·34	102	7	63	65	63	68	63	64	66	67
15–16	77	116½	2.55	1·17	106½	10	63	66	65	66	63	64	66	67
16–17	75	108	5.14	1·12	98½	9½	64	66	64	70	64	65	69	70
17–18	77	110	5.0	1·02	98½	11½	66	69	64	68	66	67	67	68
18–19	78	111½	2.50	1·16	101	10½	64	67	64	69	65	66	67	69
19–20	73	107½	7.10	1·17	96½	11	64	68	64	69	64	65	69	69
20–21	80	109½	3.30	1·15	100	9½	66	69	66	72	66	67	71	72
21–22	78	109½	1.55	1·16	101	8½	66	71	..	..	67	68	..	..
22–23	78	107½	2.0	1·11	100	7½	66	71	66	70	68	69	69	70
23–24	79	107½	3.15	1·04	98½	9	66	71	66	70	66	67	68	70
24–25	76	105	3.45	1·05	97½	7½	66	68	65	68	66	67	67	68½
25–26	76	103½	3.10	1·09	95½	8	64	67	64	68	64½	65½	65	67
26–27	75	105	4.5	1·04	96½	8½	64	66	64	65	64	65	64	65
27–28	74	104	5.5	1·03	96	8	62	64	62	65	62	63	64½	65½
28–29	74	95½	7.0	1·08	88	7½	62	64	61	63	62½	63½	64	65
29–30	75	100½	4.10	1·00	95	5½	63	64	63	64	63	64	63	64
30–31	76	105	3.4	1·18	99	6	59	63	60	62	61	62	61	62
..	..	112	4·8	1·14	102½	9½	..	..	..	..	..	..	..	..

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
31–1	87·72	12·28	3·37	2·76	·39	5·04	·72	6·58	·37	·56	41·35	58·65	30·03	2·35
1–2	87·70	12·30	3·36	2·59	·40	5·27	·68	6·73	·39	·54	41·85	58·15	30·91	2·30
2–3	87·94	12·06	3·12	2·51	·39	5·32	·72	6·96	·33	·55	42·60	57·40	30·08	2·15
3–4	87·60	12·40	3·41	2·70	·36	5·25	·68	6·97	·32	·56	42·95	57·05	28·88	2·10
4–5	87·64	12·36	3·47	2·62	·40	5·25	·62	6·95	·30	·54	41·75	58·25	30·39	2·25
5–6	87·80	12·20	3·24	2·74	·39	5·17	·66	6·91	·34	·54	42·85	57·15	28·42	2·20
6–7	87·66	12·34	3·36	2·71	·38	5·27	·62	6·92	·37	·56	41·55	58·45	29·00	2·20
7–8	87·84	12·16	3·23	2·76	·37	5·12	·68	6·74	·33	·58	42·00	58·00	30·11	2·15
8–9	87·80	12·20	3·28	2·68	·39	5·11	·74	6·68	·37	·55	42·75	57·25	29·08	2·10
9–10	87·74	12·26	3·35	2·63	·38	5·26	·64	6·89	·36	·52	41·60	58·40	29·51	2·10
10–11	87·74	12·26	3·29	2·72	·39	5·18	·68	6·99	·30	·55	43·35	56·65	28·72	2·05
11–12	87·76	12·24	3·27	2·62	·38	5·19	·78	6·97	·33	·50	43·05	56·95	27·90	2·20
12–13	88·14	11·86	3·06	2·64	·41	5·13	·62	6·58	·33	·53	43·55	56·45	28·43	2·30
13–14	87·92	12·08	3·22	2·64	..	..	·76	6·82	·23	·58	43·70	56·30	29·07	2·05
14–15	87·62	12·38	3·52	2·72	·31	5·13	·70	7·09	·25	·53	39·35	60·65	31·16	2·25
15–16	87·66	12·34	3·53	2·65	·35	5·13	·68	7·00	·37	·54	44·85	55·15	28·30	2·05
16–17	87·76	12·24	3·50	2·63	·37	5·06	·68	7·08	·30	·52	41·65	58·35	30·00	2·45
17–18	87·64	12·36	3·54	2·59	·43	5·18	·62	6·95	·24	·54	42·15	57·85	31·05	2·40
18–19	88·00	12·00	3·17	2·56	·38	5·17	·72	7·06	·19	·56	45·35	54·65	27·54	2·15
19–20	87·76	12·24	3·40	2·65	·42	5·05	·72	6·96	·31	·52		No curd kept.		
20–21	88·02	11·98	3·10	2·63	·39	5·26	·60	6·79	·33	·56	42·35	57·65	28·74	2·10
21–22	87·60	12·40	3·56	2·63	·32	5·19	·70	6·87	·34	·57	43·00	57·00	29·40	1·80
22–23	87·94	12·06	3·20	2·57	·33	5·32	·64	6·59	·38	·51	43·00	57·00	29·70	1·85
23–24	87·78	12·22	3·28	2·59	·31	5·32	·72	6·83	·38	·52	41·40	58·60	29·15	2·15
24–25	87·48	12·52	3·59	2·66	·33	5·28	·66	6·81	·36	·53	41·60	58·40	30·03	2·15
25–26	87·56	12·44	3·50	2·60	·35	5·33	·66	6·91	·23	·57	41·85	58·15	29·20	2·15
26–27	87·60	12·40	3·45	2·66	·39	5·26	·64	6·93	·27	·52	41·70	58·30	29·15	2·20
27–28	87·52	12·48	3·57	2·73	·42	5·02	·74	6·81	·32	·51	41·30	58·70	29·43	2·25
28–29	87·72	12·28	3·44	2·65	·35	5·16	·68	6·73	·32	·50	40·75	59·25	29·78	2·40
29–30	87·44	12·56	3·64	2·67	·38	5·21	·66	6·82	·34	·53	41·45	58·55	30·51	2·10
30–31	87·22	12·78	3·80	2·77	·42	5·09	·70	6·78	·37	·54	41·00	59·00	31·07	1·95
Average .	87·72	12·28	3·38	2·65	·37	5·20	·68	6·86	·32	·54	42·25	57·75	29·49	2·16

RECORD OF OBSERVATIONS MADE AT THE BATH AND W

1	2	3	4	5	6	7	8	9		10
			Relating to Evening's Milk.							
			At Night.				In Morning.			
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.
		galls.	P.M.				A.M.	min.	max.	
31–1	Sharnam's Large Leaze . . .	43	6.55	62	84	·22	6.50	61	63	68
1–2	Ditto	43	6.35	63	82	·21	7.30	62	64	70
2–3	Ditto	42	6.40	62	83	·20	7.30	61	63	67
3–4	Ditto	42	6.28	61	79	·22	7.30	60	61	67
4–5	Moor House, Large Leaze . . .	38	5.30	62	85	·20	7.30	60	62	67
5–6	Ditto	42	6.30	62	88	·22	7.30	60	62	69
6–7	Ditto	41	6.40	62	84	·21	7.30	60	62	69
7–8	Ditto	42	7.0	61	83	·21	7.15	60	62	67
8–9	Ditto	43	6.20	61	85	·22	7.30	59	62	65
9–10	Ditto	43	6.45	62	85	·21	7.10	61	62	71
10–11	Ditto	40	6.15	62	84	·22	7.30	60	62	70
11–12	Ditto	38	5.40	63	83	·22	7.30	62	64	69
12–13	Ditto	40	6.15	63	87	·22	7.15	63	64	71
13–14	Ditto	41	6.30	62	84	·21	7.25	60	62	66
14–15	Ditto	40	6.20	62	87	·22	6.40	60	63	69
15–16	Ditto	41	6.15	63	86	·21	6.35	61	63	70
16–17	Ditto	38	6.30	61	82	·21	6.25	61	62	68
17–18	Ditto	39	6.30	61	86	·22	7.20	59	61	67
18–19	Sharnam's Large Leaze . . .	36	5.10	61	86	·22	7.20	60	62	67
19–20	Ditto	43	6.45	62	89	22	7.25	62	62	72
20–21	Ditto	40	6.45	63	89	·23	6.50	62	65	70
21–22	Ditto . . .	38	6.25	63	80	·22	6.45	61	63	68
22–23	Ditto	38	6.40	61	80	·21	7.5	61	62	69
23–24	Moor House, Large Leaze . . .	37	6.30	62	82	·20	7.30	62	63	70
24–25	Ditto	37	6.10	62	85	·21	7.25	61	62	64
25–26	Ditto . . .	36	5.10	62	85	·22	7.25	61	63	69
26–27	Ditto	37	6.10	63	85	21	7.20	62	63	70
27–28	Ditto	33	6.20	62	82	·22	7.10	59	62	64
28–29	Ditto	35	6.30	60	81	·21	7.30	59	61	66
29–30	Ditto	33	6.10	59	83	·21	7.30	59	61	66
Average		39	..	61	84	·21	..	60	62	68

F ENGLAND SOCIETY'S CHEESE SCHOOL, SEPTEMBER, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILK, &c.			
										Rennet Added.	
Name of Field.	Vol. of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		galls.			A.M.	ounces.	
arnam's Large Leaze . . .	50	·22	93	32	92	2	·46	·23	7.40	1·57	9477
tto	45	·21	88	36	90	2	·46	·23	7.56	1·49	9149
tto	47	·21	89	36	91	2	·46	·24	7.58	1·51	9430
tto	44	·21	86	35	88	2	·44	·22	8.3	1·46	9424
oor House, Large Leaze . . .	48	·22	86	38	82	2	·42	·23	8.13	1·46	9424
tto	50	·22	92	42	82	2	·43	·24	8.5	1·48	9945
tto	47	·22	88	41	83	2	·44	·23	8.0	1·49	9449
tto	46	·22	88	42	84	2	·42	·24	7.45	1·49	9449
itto	47	·21	90	43	83	2	·43	·23	7.56	1·52	9473
itto	47	·22	90	43	83	2	·43	·23	7.44	1 52	9473
itto	47	·22	87	40	83	2	·45	·23	7.55	1·48	9405
itto	51	·22	89	38	83	2	·46	·23	7.40	1·51	9430
itto	46	·22	86	40	82	2	·46	·23	7.40	1·46	9424
itto	45	·22	86	41	85	2	·46	·24	7.47	1·46	9424
itto	45	·22	85	40	84	2	·45	·23	7.45	1.45	9379
itto	46	·21	87	41	82	2	·45	·22	7.45	1·48	9405
tto	45	·22	83	38	84	2	·44	·23	7.37	1·41	9418
itto	44	·22	83	39	86	2	·45	·23	7.50	1·44	9222
arnam's Large Leaze . . .	47	·22	83	36	84	2	·45	·22	7.36	1·44	9222
tto	44	·21	87	43	82	none	..	·22	8.2	1·51	9218
tto	44	·21	84	40	84	1	·40	·23	7.42	1·46	9205
itto	44	·21	82	38	86	1	·44	·22	7.45	1·43	9174
itto	42	·22	80	38	82	1	·43	·22	7.43	1·42	9014
oor House, Large Leaze . . .	43	·22	80	37	84	1	·47	·23	7.49	1·42	9014
itto	43	·21	80	37	82	1	·48	·23	7.55	1·42	9014
itto	45	·22	81	36	84	nono	..	·23	7.43	1·44	9000
itto	42	·21	79	37	85	1	·43	·23	7.54	1·40	9028
itto	42	·22	75	33	88	2	·45	·24	7.32	1·33	9022
itto	41	·22	76	35	90	2	·47	·23	7.52	1·35	9007
itto	40	·21	73	33	89	2	·45	·23	7.53	1·29	9054
.. ..	45	·22	84	..	..	..	·44	·23	7.49	..	9302

RECORD OF OBSERVATIONS MADE AT THE BATH AND W

	24	25	26	27	28	29	30	31	32	33	34	34a
						Temp. of Scald.				Relating to Whey		
Day of Month.	Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Acidity of Whey put aside.	Time Scalding commences.	1st	2nd	Time taken in stirring.	Time in Scald.	Temp. when drawn.	Acidity.	Volume.
	A.M.		A.M.		A.M.			min.	h. m.			galls.
31–1	8.37	·16	8.53	·17	9.50	88	90	30	1 15	87	·20	77
1–2	8.45	·18	9.5	·18	10.0	88	90	30	1 17	88	·22	73
2–3	8.45	·17	9.8	·17	10.6	88	90	35	1 24	87	·20	73
3–4	8.53	·14	9.15	·16	10.0	88	90	45	1 30	87	·19	72
4–5	9.0	·15	9.20	·17	10.10	88	90	40	1 30	86	·20	72
5–6	9.0	·16	9.20	·17	10.10	88	90	35	1 24	87	·20	76
6–7	8.47	·16	9.10	·17	10.5	88	90	30	1 22	87	·19	73
7–8	8.45	·15	9.8	·16	10.5	88	90	30	1 21	87	·20	72
8–9	8.45	·15	9.15	·15	10.12	88	90	30	1 9	87	·18	73
9–10	8.32	·15	9.0	·16	9.48	88	90	35	1 25	87	·19	73
10–11	8.50	·15	9.27	·17	10.22	88	90	30	1 18	87	·20	73
11–12	8.27	·16	8.50	·17	9.52	88	90	30	1 19	87	·20	73
12–13	8.30	·15	8.55	·16	9.49	88	90	30	1 14	86	·21	68
13–14	8 32	·15	9.0	·16	9.50	88	90	30	1 17	87	·21	70
14–15	8.30	·15	9.0	·17	9.53	88	90	30	1 20	87	·21	70
15–16	8.35	·15	8.55	·16	9.48	88	91	30	1 18	87	·20	67
16–17	8.33	·15	9.0	·16	9.47	88	90	35	1 23	87	·21	68
17–18	8.35	·15	8.52	·16	9.49	88	90	33	1 22	87	·19	68
18–19	8.28	·15	8.50	·16	9.40	88	90	35	1 20	86	·22	70
19–20	8.46	·15	8.10	·16	10.5	88	90	30	1 13	87	·17	70
20–21	8.35	·15	9.0	·15	10.0	88	90	47	1 35	87	·20	68
21–22	8.45	·15	9.15	·15	10.2	88	90	45	1 33	87	·18	67
22–23	8.27	·15	8.54	·15	9.45	88	90	35	1 29	86	·18	65
23–24	8.35	·15	9.0	·15	9.48	88	90	30	1 18	87	·18	65
24–25	8.50	·14	9.30	·15	10.17	88	90	45	1 33	87	·19	65
25–26	8.45	·13	9.15	·14	10.8	88	90	60	1 57	87	·17	66
26–27	8.50	·14	9.20	·15	10.15	88	90	30	1 20	88	·18	64
27–28	8.17	·14	8.45	·16	9.34	88	90	30	1 11	87	·20	61
28–29	8.37	·15	9.5	·16	9.55	88	90	33	1 25	87	·21	63
29–30	8.45	·15	9.15	..	10.5	88	90	30	1 13	87	·19	57
Average	..	·15	..	·16	..	..	..	35	1 22	..	·20	69

ENGLAND SOCIETY'S CHEESE SCHOOL, SEPTEMBER, 1892.—*contd.*

37	38	39	40	41	42	43	44	45	46	47		48	49	
		Acidity of Whey during Treatment of Curd.								Salt Added.				
Time Curd was taken from Tub.	Temp. of Curd when taken from Tub.	When taken to Cooler.	After 1st Cutting.	After 2nd Cutting.	After 1st Turning.	After 2nd Turning.	After 3rd Turning.	After 4th Turning.	Acidity of Curd when Milled.	Weight.		Percentage.	Temp. of Dairy.	
P.M.										lbs.	oz.		min.	max.
12.20	89	·48	·64	·83	·94	..	..	..	6·20	2	1	1·94	61	65
12.30	89	·57	·78	·94	..	..	..	..	6·00	1	15	1·92	62	65
12.35	88	·46	·61	·75	·92	..	..	..	4·60	2	0	1·91	62	65
12.50	88	·42	·59	·78	·83	..	..	..	5·40	1	14	1·82	61	64
12.50	87	·45	·59	·79	·94	..	..	..	5·40	1	14	1·87	61	64
12.40	88	·43	·61	·77	·84	..	..	..	4·40	2	1	1·96	60	64
12.50	87	·44	·65	·81	·99	..	..	..	4·20	2	0	2 01	60	64
12.50	88	·44	·61	·81	·95	..	..	..	5·40	2	0	1·96	60	63
1.3	87	·45	·65	·86	·97	..	..	..	6·00	2	1	1·98	60	63
12.35	87	·53	·63	·90	..	..	..	..	3·80	2	1	1·97	61	65
12.40	88	·49	·69	·91	..	..	..	..	4·20	2	0	1·95	62	65
12.33	88	·59	·75	1·03	..	..	..	..	4·20	2	1	1·97	63	63
12.15	88	·61	·84	·95	..	..	..	..	3·80	2	0	1·94	63	66
12.15	88	·61	·85	1·00	..	..	..	..	4·00	2	0	1·95	61	64
12.20	88	·58	·82	1·00	..	..	..	..	5·2	2	0	2·00	60	65
12.5	89	·46	·75	·98	..	..	..	..	4·20	2	1	1·98	61	64
12.13	88	·50	·73	96	..	..	..	..	4·00	2	0	2·00	60	64
12.19	88	·45	·65	·84	..	..	..	..	6·10	2	0	2 02	59	63
12.5	89	·55	·87	1·00	..	..	..	..	5·40	2	0	2·04	60	65
12.25	87	·24	·30	·41	·51	·68	·79	..	4·20	2	1	2·10	62	65
12.35	87	·56	·77	·92	..	..	..	..	4·20	2	0	2·02	62	65
12.45	89	·42	·63	·85	..	..	..	..	4·80	2	0	2 04	61	64
12.18	88	·47	·68	·93	..	..	..	..	5·20	1	15	2·04	61	64
12.10	89	·44	·67	·85	..	..	..	..	3·80	1	15	2·07	62	65
12.48	88	·46	·64	·85	..	..	..	..	4·40	1	15	2·01	62	65
1.15	88	·37	·56	·78	·87	..	..	..	4·00	1	15	2·08	62	65
12.37	88	·47	·69	·89	..	..	..	..	4·20	1	15	2·06	62	65
11.45	89	·49	·71	·86	..	..	..	..	5·00	1	14	2·09	59	64
12.15	87	·50	·72	·87	..	..	..	..	4·80	1	14	2·07	60	62
12.25	88	·46	·63	85	..	..	..	..	4·00	1	14	2·07	59	62
12.30	..	..	..	..	..	..	..	..	4·69	..		..	61	64

RECORD OF OBSERVATIONS, SEPTEMBER, 1892—conti

	50	51	52	53	54	55	56		57		58		5
	Relating to Curd.			Relating to Cheeses.									
							Temp. of Cheese Room.				Hygrometer R		
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of Liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Morning.		Evening.		Morning.		E
							Min.	Max.	Min.	Max.	Wet.	Dry.	W
		lbs.	P.M.		lbs.	lbs.							
31–1	76	106	3.55	1·13	97	9	58	60	58	63	59	60	61
1–2	76	100½	3.35	1·17	92½	8	60	62	60	62	61	62	60
2–3	74	104½	4.7	1·15	96½	8	57	60	58	61	59	60	59
3–4	73	102½	4.25	1·10	94½	8	56	59	56	58	57	58	57
4–5	74	100	4.20	1·11	92½	7½	55	58	55	60	57	58	59
5–6	74	105	4.30	1·10	96	9	57	59	56	59	58	59	58
6–7	74	99½	4.30	1·06	92	7½	57	60	55	60	59	60	58
7–8	75	102	4.30	1·08	95	7	56	59	54	59	57	58	57
8–9	74	104	4.30	1·11	96	8	55	60	56	60	58	59	59
9–10	76	104½	3.55	1·18	95	9½	57	60	60	63	59	60	62
10–11	76	102½	3.35	1·09	93½	9	60	62	60	63	60	61	62
11–12	75	104½	3.5	1·08	95½	9	60	62	61	63	61	62	62
12–13	76	103	2.30	1·11	95	8	62	63	60	62	62	63	60
13–14	74	102½	2.55	1·19	95½	7	58	62	61	63	58	59	61
14–15	75	100	3.0	1·11	92	8	57	62	60	64	59	60	61
15–16	74	104	2.45	1·17	95	9	60	62	60	62	60	62	59
16–17	75	100	2.53	1·10	92	8	57	60	56	62	57	59	58
17–18	75	99	2.55	1·05	91	8	55	59	55	61	54	57	59
18–19	76	98	2.50	1·20	88½	9½	58	61	57	65	56	59	62
19–20	74	98	7.10	·98	91	7	62	62	62	64	61	63	62
20–21	76	99	2.55	1·10	91	8	62	63	60	63	61	63	61
21–22	75	98	3.30	·98	92	6	58	61	61	64	58	60	61
22–23	75	95	2.55	1·01	87½	7½	58	60	59	62	58	60	60
23–24	76	93½	2.40	·95	86	7½	58	60	60	64	60	61	62
24–25	75	96	3.30	1·00	88	8	59	62	57	66	59	61	61
25–26	75	93	4.30	1·00	86	7	57	62	57	60	58	59	60
26–27	76	94	3.10	1·01	86½	7½	60	62	59	61	60	61	60
27–28	76	89½	2.0	1·03	83½	6	56	60	56	59	57	58	58
28–29	74	91½	2.40	1·00	86½	5	54	58	58	61	55	56	60
29–30	73	91½	3.0	·95	86½	5	54	56	54	58	55	56	56
..	..	99	3.33	1·07	91	8	..	..	..	..	..	..	..

RECORD OF ANALYSES, SEPTEMBER, 1892.

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
31–1	87·38	12·62	3·63	2·73	·37	5·21	·68	6·92	·36	·50	41·40	58·60	29·82	2·15
1–2	87·62	12·38	3·47	2·77	·36	5·12	·66	6·81	·32	·52	43·60	56·10	29·43	2·05
2–3	87·38	12·62	3·63	2·78	·38	5·15	·68	6·90	·29	·56	40·95	59·05	30·98	2·10
3–4	87·46	12·54	3·62	2·82	·38	5·04	·68	6·87	·39	·53	40·95	59·05	31·22	2·30
4–5	87·34	12·66	3·66	2·70	·38	5·26	·66	6·86	·34	·52	42·55	57·45	30·73	2·10
5–6	87·58	12·42	3·42	2·75	·40	5·19	·66	6·76	·28	·55	42·60	57·40	30·38	2·15
6–7	87·62	12·38	3·39	2·81	·40	5·14	·64	6·58	·32	·54	41·85	58·15	29·51	2·20
7–8	87·56	12·44	3·44	2·82	·41	5·11	·66	6·85	·33	·57	41·70	58·30	29·84	2·35
8–9	87·58	12·42	3·46	..	..	..	·62	6·82	·31	·53	41·80	58·20	30·36	2·25
9–10	87·54	12·46	3·50	2·79	·38	5·11	·68	6·64	·39	·54	41·70	58·30	30·49	2·10
10–11	87·56	12·44	3·42	2·85	·40	5·09	·68	6·79	·36	·54	42·95	57·05	28·56	2·10
11–12	87·36	12·64	3·65	2·84	·39	5·05	·64	6·86	·32	·54	42·75	57·25	29·26	2·05
12–13	87·48	12·52	3·55	2·79	·42	5·12	·64	6·83	·37	·51	42·45	57·55	29·83	2·05
13–14	87·38	12·62	3·69	2·87	·40	5·00	·66	6·73	·31	·52	42·65	57·35	29·29	2·10
14–15	87·56	12·44	3·57	2·89	·39	4·93	·66	6·81	·30	·52	43·15	56·85	29·51	2·10
15–16	87·38	12·62	3·65	2·88	·39	5·02	·68	6·65	·34	·51	43·00	57·00	29·15	2·05
16–17	87·24	12·76	3·71	2·98	·40	4·98	·74	6·82	·37	·51	43·55	56·45	29·15	2·05
17–18	87·48	12·52	3·51	2·94	·40	5·01	·66	6·81	·30	·53	42·60	57·40	28·48	2·10
18–19	87·48	12·52	3·45	2·93	·41	5·05	·68	6·68	·32	·51	41·45	58·55	29·37	2·20
19–20	87·52	12·48	3·47	2·91	·40	5·02	·68	6·77	·34	·52	40·85	59·15	30·19	2·25
20–21	87·64	12·36	3·28	2·96	·41	5·07	·64	6·54	·32	·53	42·35	57·65	29·96	2·15
21–22	87·22	12·78	3·74	2·95	·40	5·03	·66	6·87	·36	·53	40·00	60·00	30·08	2·25
22–23	87·36	12·64	3·65	2·95	·42	5·06	·66	6·87	·32	·54	43·25	56·75	29·43	2·15
23–24	87·56	12·44	3·48	2·90	·40	5·02	·61	6·82	·30	·51	41·15	58·85	29·92	2·15
24–25	87·23	12·72	3·71	2·92	·41	5·00	·68	6·78	·32	·54	42·15	57·85	30·21	2·10
25–26	87·44	12·56	3·64	2·88	·42	4·92	·70	6·69	·36	·52	40·85	59·15	30·78	2·35
26–27	87·44	12·56	3·58	2·93	·42	4·97	·66	6·78	·32	·53	42·25	57·75	29·69	2·15
27–28	87·48	12·52	3·51	2·98	·46	4·91	·66	6·73	·31	·55	42·40	57·60	29·58	2·10
28–29	87·28	12·72	3·71	2·98	·45	4·92	·66	6·78	·26	·55	43·15	56·85	28·86	2·05
29–30	86·98	13·02	3·96	3·03	·47	4·92	·64	6·93	·31	·55	43·00	57·00	30·66	2·05
Average .	87·44	12·56	3·57	2·87	·41	5·05	·66	6·78	·33	·53	42·17	57·83	29·49	2·14

RECORD OF OBSERVATIONS MADE AT THE BATH AND W

1	2	3	4	5	6	7	8	9		10
		Relating to Evening's Milk.								
			At Night.				In Morning.			
Day of Month.	Name of Field.	Volume of Milk.	Time.	Temp. of Dairy.	Temp. of Milk.	Acidity.	Time.	Temp. of Dairy.		Temp. of Milk.
		galls.	P.M.				A.M.	min.	max.	
30–1	Moor House, Large Leaze . . .	33	5.50	60	84	·20	7.5	58	60	65
1–2	Ditto	31	6.10	56	78	·21	7.25	56	58	63
2–3	Ditto	29	5.10	57	81	·21	7.30	57	58	63
3–4	Ditto	31	6.20	58	78	·22	7.30	57	59	63
4–5	Ditto	32	6.10	59	84	·20	7.25	57	59	64
5–6	Sharnam's Large Leaze . . .	33	6.30	59	83	·22	7.35	58	59	66
6–7	Ditto	32	6.25	60	83	·21	7.35	58	60	66
7–8	Ditto	29	6.15	59	76	·21	7.30	58	59	62
8–9	Mixed Fields . .	30	6.15	58	73	·21	7.35	57	58	62
9–10	Ditto	27	5.10	58	71	·22	7.25	57	58	60
10–11	Ditto	31	6.10	58	78	·23	7.30	55	58	62
11–12	Ditto	28	6.20	57	78	·21	7.30	56	57	61
12–13	Ditto	30	6.20	57	75	·21	7.30	56	57	62
13–14	Ditto	28	6.5	62	75	·22	7.30	57	65	65
14–15	Ditto	28	6.5	65	70	·21	7.35	64	66	64
15–16	Ditto	27	6.7	64	76	·20	7.40	63	65	65
16–17	Ditto	24	5.35	69	75	·21	7.10	60	71	63
17–18	Ditto	25	6.10	64	76	·21	7.30	59	65	62
18–19	Ditto	23	6.20	66	73	·21	7.35	58	71	62
19–20	Ditto	24	6.25	68	75	·21	7.40	65	69	63
20–21	Ditto	24	6.0	67	79	·20	7.40	66	71	66
21–22	Ditto	25	6.10	68	76	·21	7.55	66	77	65
22–23	Ditto	23	6.20	65	71	·20	7.40	64	73	62
23–24	Ditto	22	5.15	67	74	·21	7.40	64	72	63
24–25	Ditto	22	6.25	68	72	·20	7.40	64	70	63
25–26	Ditto	23	6.10	67	72	·20	7.20	57	64	59
26–27	Ditto	22	6.0	66	71	·21	7.50	62	68	61
27–28	Ditto	24	6.5	68	76	·20	7.45	66	72	67
28–29	Ditto	21	5.50	70	75	·21	7.40	67	71	68
29–30	Ditto	19	6.5	69	78	·20	7.55	67	69	65
30–31	Ditto	18	5.0	69	77	·20	7.30	67	69	66
Average		26	..	66	76	·21	..	60	65	63

ENGLAND SOCIETY'S CHEESE SCHOOL, OCTOBER, 1892.

12	13	14	15	16	17	18	19	20	21	22	23
MORNING'S MILK.				MILK HEATED.		STALE WHEY.		MIXED MILK, &c.			
										Rennet added.	
Name of Field.	Vol of Milk.	Acidity.	Total Vol. of Milk.	Quantity.	To Temp.	Quantity.	Acidity.	Acidity before Renneting.	Time of Renneting.	Vol.	Proportion by Volume.
	galls.		galls.	galls.		galls.			A.M.	ounces.	
or House, Large Leaze	38	·21	71	33	90	2	·44	·23	8.8	1·26	9015
to	38	·21	69	31	87	2	·46	·23	8.3	1 22	9049
to	39	·21	68	29	90	2	·43	·22	7.51	1·20	9066
to	37	·22	68	31	90	2	·40	·23	7.53	1·20	9066
to	37	·21	69	39	90	2	·41	·22	8.14	1·22	9049
arnam's Large Leaze	37	·22	70	38	90	2	·43	·23	8.18	1·24	9032
to	37	·22	69	32	88	2	·43	·24	7.56	1·22	9049
to	36	·21	65	38	90	2	·40	·22	7.55	1·15	9043
xed Fields	36	·21	66	36	90	2	·40	·22	8.0	1·17	9025
to	35	·21	62	37	90	2	·40	·22	7.43	1·10	9018
to	33	·21	64	38	90	2	·38	·23	7.52	1·13	9062
to	35	·21	63	43	89	2	·38	·22	7.52	1·12	9000
to	35	·21	65	43	90	2	·39	·23	8.0	1·15	9043
to	34	·21	62	41	90	2	·38	·21	8.13	1·10	9018
to	32	·21	60	39	90	2	·41	·23	8.2	1·06	9056
to	32	·21	59	39	90	2	·42	·23	8.7	1·04	9077
to	33	·22	57	38	90	2	·40	·23	8.5	1·01	9029
to	31	·21	56	41	90	2	·40	·23	8.3	·99	9050
to	31	·21	55	38	90	2	·37	·22	7.55	·97	9072
to	30	·20	54	38	90	2	·38	·23	8.11	·96	9000
to	30	·21	54	38	90	2	·40	·23	8.4	·96	9000
to	27	·21	52	36	90	2	·40	·23	8.9	·92	9043
to	29	·21	52	38	90	2	·39	·22	8.13	·92	9043
to	30	·21	52	38	90	2	·39	·21	8.4	·92	9043
to	30	·21	52	38	90	2	·41	·23	8.20	·92	9043
to	29	·21	52	42	90	2	·40	·22	8.13	·92	9048
to	25	·20	47	33	90	2	·41	·22	8.16	·83	9060
to	27	·21	51	32	90	2	·44	·22	8.18	·90	9066
to	26	·20	47	33	90	2	·45	·23	8.15	·83	9060
to	25	·20	44	31	90	2	·45	·22	8.17	·78	9025
to	26	·21	44	28	90	2	·44	·22	8.8	·78	9025
	32	·21	58	..	..	..	·41	·22	8.5	..	9041

RECORD OF OBSERVATIONS MADE AT THE BATH AND WEST

	24	25	26	27	28	29	30	31	32	33	34	34a	35
						Temp. of Scald.				Relating to Whey.			
Day of Month.	Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Acidity of Whey put aside.	Time Scalding commences.	1st	2nd	Time taken in stirring.	Time in Scald.	Temp. when drawn.	Acidity.	Volume.	Acidity of draining from piled Curd.
	A.M.		A.M.		A.M.			min.	h. m.			galls.	
30–1	8.53	·16	9.28	·16	10.17	88	90	30	1 13	87	·20	57	·29
1–2	8.52	·15	9.18	·16	10.10	88	90	33	1 25	85	·22	57	·29
2–3	8.37	·15	9.5	·16	10.5	88	90	30	1 30	85	·21	55	·29
3–4	8.40	·15	9.15	·16	10.5	88	90	30	1 15	87	·18	56	·23
4–5	9.10	·15	9.37	·15	10.30	88	91	30	1 20	87	·19	57	·26
5–6	9.10	·15	9.40	·16	10.30	88	91	31	1 18	88	·19	57	·24
6–7	8.43	·14	9.10	·16	10.5	88	90	35	1 30	86	·20	57	·27
7–8	8.43	·14	9.15	·15	10.7	88	90	40	1 13	86	·18	53	·24
8–9	8.52	·14	9.25	·15	10.13	88	90	33	1 11	86	·17	52	·21
9–10	8.30	·14	9.0	·14	9.51	88	90	45	1 30	87	·18	50	·25
10–11	8.38	·13	9.18	·15	10.6	88	90	40	1 35	85	·19	54	·23
11–12	8.45	·13	9.20	·14	10.10	88	90	45	1 45	85	·20	52	·27
12–13	8.55	·14	9.20	·15	10.7	88	90	60	1 45	85	·18	53	·21
13–14	9.3	·14	9.35	·15	10.25	88	90	45	1 30	88	·18	51	·21
14–15	8.48	·14	9.25	·14	10.15	88	90	57	1 35	85	·18	48	·21
15–16	8.58	·14	9.30	·15	10.23	88	90	37	1 27	86	·17	48	·21
16–17	8.50	·14	9.20	·15	10.25	88	90	35	1 25	85	·19	46	·25
17–18	8.50	·14	9.24	·15	10.13	88	90	50	1 37	85	·18	44	·20
18–19	8.42	·14	9.30	·15	10.32	88	90	35	1 20	85	·18	43	·22
19–20	9.0	·14	9.40	·16	10.30	88	90	40	1 28	86	·18	43	·25
20–21	8.52	·15	9.27	·15	10.12	88	90	35	1 28	86	·17	43	·21
21–22	8.55	·15	9.34	·15	10.29	88	90	40	1 31	86	·18	40	·24
22–23	8.55	·13	9.40	·14	10.32	88	90	37	1 23	86	·16	40	·21
23–24	9.0	·13	9.35	·15	10.25	88	90	40	1 33	85	·17	40	·20
24–25	9.10	·14	9.40	·15	10.28	88	90	40	1 32	86	·18	40	·25
25–26	9.6	·14	9.40	·16	10.30	88	90	45	1 30	85	·18	40	·25
26–27	9.16	·14	10.3	·16	10.50	88	90	45	1 45	86	·22	37	·32
27–28	9.13	·14	9.45	·15	10.33	88	90	40	1 27	86	·20	38	·27
28–29	9.4	·15	9.35	·16	10.22	88	91	30	1 16	86	·22	37	·28
29–30	9.5	·15	9.35	·16	10.20	88	90	45	1 19	86	·20	35	·28
30–31	8.50	·15	9.20	·16	10.5	88	90	45	1 20	85	·24	..	·25
Average	..	·14	..	·15	..	..	..	39	1 27	..	·19	47	·24

꞉LAND SOCIETY'S CHEESE SCHOOL, OCTOBER, 1892—*contd.*

7	38	39	40	41	42	43	44	45	46	47	48	49	
		ACIDITY OF WHEY DURING TREATMENT OF CURD.								SALT ADDED.			
ne rd ɪs en ɱ ɪb.	Temp. of Curd when taken trom Tub.	When taken to Cooler.	After 1st Cut-ting.	After 2nd Cut-ting.	After 1st Turn-ing.	After 2nd Turn-ting.	After 3rd Turn-ing.	After 4th Turn-ing.	Acidity of Curd when Milled.	Weight	Per-centage.	Temp. of Dairy.	
ᴍ.										lbs. oz.		min.	max.
35	88	·46	·61	·77	·89	..	..	..	3·80	1 12	2·00	58	61
30	87	·46	·61	·78	·82	..	..	..	4·60	1 12	2·03	58	61
30	88	·49	·60	·83	..	..	..	..	5·40	1 11	1·99	58	61
27	87	·39	·52	·72	·75	·80	1·01	..	5·60	1 11	2·07	58	62
50	88	·41	·58	·70	·74	..	..	..	4·20	1 12	2·07	57	62
58	88	·42	·56	·68	·87	..	..	..	4·20	1 12	2·05	58	62
36	87	·44	·56	·82	·85	..	..	..	3·60	1 12	2·05	59	62
55	88	·43	·52	·72	·80	·85	..	..	3·40	1 10	2·01	58	60
40	86	·35	·49	·65	·75	·76	·99	..	3·80	1 10	2·02	57	60
37	87	·43	·55	·68	·79	·89	..	..	3·60	1 9	2·01	57	60
45	85	·35	·48	·67	·74	·81	·93	..	4·00	1 10	2·02	56	60
47	85	·41	·52	·71	·72	·83	·86	..	3·60	1 9	2·01	56	60
50	84	·29	·38	·52	·65	·73	·84	..	3·40	1 10	2·05	57	65
22	87	·42	·55	·70	·76	·85	..	..	3·40	1 9	2·18	63	68
16	87	·42	·53	·68	·75	·82	..	..	3·80	1 9	2·06	64	69
50	87	·35	·43	·60	·71	·76	·84	..	4·10	1 8	2·09	66	74
45	88	·36	·51	·61	·71	·77	·90	..	..	1 8	2·05	59	71
0	86	·37	·46	·65	·72	·82	·85	..	..	1 8	2·12	65	75
45	86	·31	·43	·60	·68	·77	·90	..	5·00	1 7	2·09	59	70
0	86	·42	·54	·69	·81	·86	..	..	4·60	1 7	2·13	67	72
49	87	·37	·49	·66	·80	·81	·90	..	4·00	1 7	2·17	67	74
55	86	·38	·52	·66	·80	·81	·88	..	4·20	1 6	2·14	64	70
15	87	·43	·55	·70	·74	·86	..	..	3·40	1 6	2·14	66	70
)	86	·35	·44	·60	·82	·81	·89	..	3·60	1 6	2·11	65	72
55	86	·39	·49	·62	·68	·82	·85	1·01	3·40	1 6	2·11	64	70
3	86	·50	·68	·71	·83	·98	..	..	4·20	1 6	2·13	56	69
23	87	·50	·69	·74	·96	..	..	..	4·40	1 4	2·15	66	74
ı	87	·58	·71	·90	1·01	..	..	..	3·80	1 5	2·13	67	71
4	88	·49	·64	·85	·87	1·03	..	..	4·80	1 4	2·17	66	71
5	86	·48	·68	·82	·96	..	..	..	4·00	1 3	2·17	66	73
0	88	·47	·64	·76	·84	·94	..	..	5·10	1 3	2·16	68	72
1	..	..	..	..	..	..	..	..	4·10	..	..	61	67

RECORD OF OBSERVATIONS, OCTOBER, 1892—*contin*

	50	51	52	53	54	55	56		57		58		
	RELATING TO CURD.			RELATING TO CHEESES.									
Day of Month.	Temp. in Vat.	Weight when Vatted.	Time of Vatting.	Acidity of Liquid from Press.	Weight taken to Cheese Room.	Loss in Press.	Temp. of Cheese Room.				Hygrometer R		
							Morning.		Evening.		Morning.		E
							Min	Max.	Min.	Max.	Wet.	Dry.	W
		lbs.	P.M.		lbs.	lbs.							
30–1	72	87½	3.15	1·05	81½	6	52	55	52	56	53	54	55
1–2	73	86	3.40	1·02	81	5	54	65	54	64	55	56	59
2–3	74	84½	3.0	·92	80	4½	52	64	53	68	54	56	61
3–4	70	81½	5.55	1·17	77½	4	56	64	60	67	58	61	62
4–5	73	81½	4.10	·94	79	5½	57	69	56	66	56	59	61
5–6	73	85	4.8	1·05	78½	6½	59	67	59	66	58	61	62
6–7	74	85	3.45	·99	80	5	59	71	64	66	62½	67½	62
7–8	74	80½	5.18	1·07	76	4½	59	66	58	62	59	6	58
8–9	67	80	8.5	1·30	75½	4½	57	63	60	65	58	62	59
9–10	70	77½	4.55	1·14	74	3½	56	62	55	63	5	57	57
10–11	69	80	6.45	1·16	75½	4½	52	59	52	6	52	54	55
11–12	69	77½	5.35	1·14	74	3½	52	64	55	65	55	57	61
12–13	70	79	7.55	1·16	75	4	55	62	57	68	57	58½	60
13–14	71	71½	6.20	1·15	68	3½	57	64	56	67	56	58	59
14–15	72	75½	6.0	1·13	71½	4	56	70	56	68	55	58	63
15–16	71½	71½	7.45	1·17	67½	4	59	68	56	58	59	61	57
16–17	71	73	6.45	1·14	68½	4½	52	56	5	54	52	54	53
17–18	71	70½	6.40	1·11	66½	4	59	63	49	56	59	61	55
18–19	71	68½	6.40	1·10	64½	4	51	5	50	56	50	53	54
19–20	73	67	5.55	1·15	63	4	53	65	53	68	53	55	59
20–21	70	66	6.15	1·09	61½	4½	57	66	61	69	59	64	59
21–22	70	64	7.0	1·20	59	5	54	64	54	6	53	56	56
22–23	70	64	6.0	1·09	59	5	54	60	59	63	58	61	62
23–24	71	65	7.15	1·17	59½	5½	56	62	58	62	57	59	59
24–25	69	65	7.15	1·18	60½	4½	54	59	56	57	55	60	50
25–26	71	64½	5.15	1·14	59½	5	48	57	48	57	47	50	50
26–27	74	58	4.30	1·12	54½	3½	50	51	50	60	50	52	57
27–28	75	61½	4.20	1·03	57	4½	58	63	58	61	59	61	60
28–29	74	57½	4.30	1·07	53½	4	58	60	58	62	58	59	61
29–30	75	54½	3.55	1·13	51½	3	56	66	55	66	55	58	61
30–31	73	55	4.0	1·07	51	4	55	67	55	56	53	58	54
..	..	72	5.34	1·11	68	4	..	..	..	..	..	..	..

Day of Month.	Composition of Mixed Milk.							Composition of Whey.			Composition of Curd.			
	Water.	Solids.	Fat.	Casein.	Albumin	Sugar.	Ash.	Solids.	Fat.	Ash.	Water.	Solids.	Fat.	Ash.
30–1	87·10	12·90	3·92	3·00	·50	4·82	·66	6·91	·37	·53	42·45	57·55	30·08	2·10
1–2	87·16	12·84	3·75	3·03	·47	4·93	·66	6·79	·29	·54	42·05	57·95	29·96	2·15
2–3	86·98	13·02	3·96	3·01	·51	4·86	·68	6·87	·29	·55	41·45	58·55	31·05	2·15
3–4	86·88	13·12	4·01	3·13	·52	4·80	·66	6·90	·36	·56	40·90	59·10	30·74	2·20
4–5	87·14	12·86	3·79	3·05	·53	4·83	·66	6·84	·32	·53	41·30	58·70	26·75	2·35
5–6	87·08	12·92	3·82	3·07	·43	4·92	·68	6·83	·40	·54	41·30	58·70	31·56	2·30
6–7	87·04	12·96	3·93	3·10	·42	4·77	·74	6·90	·28	·51	42·65	57·35	29·84	2·15
7–8	86·82	13·18	4·04	3·12	·47	4·89	·66	6·85	·37	·54	41·95	58·05	28·75	2·25
8–9	86·94	13·06	3·94	3·08	·52	4·80	·72	6·89	·35	·55	41·75	58·25	30·16	2·25
9–10	86·64	13·36	4·21	3·22	·54	4·71	·68	6·86	·32	·56	41·65	58·35	30·09	2·20
10–11	86·80	13·20	4·11	3·04	·50	4·83	·72	6·93	·33	·55	41·75	58·25	30·09	2·15
11–12	86·92	13·08	3·91	3·07	·48	4·88	·74	6·85	·31	·53	41·60	58·40	30·49	2·20
12–13	87·02	12·98	3·87	3·04	·47	4·92	·68	6·88	·23	·52	40·30	59·70	30·19	2·45
13–14	87·28	12·72	3·58	3·13	·47	4·82	·72	6·86	·30	·54	40·65	59·35	29·58	2·45
14–15	86·62	13·38	4·16	3·04	·50	4·96	·72	6·91	·37	·54	40·65	59·35	29·78	2·40
15–16	86·88	13·12	4·01	3·09	·51	4·75	·76	6·96	·26	·54	41·35	58·65	29·41	2·30
16–17	86·64	13·36	4·21	2·99	·53	4·95	·68	6·91	·33	·54	40·60	59·40	31·22	2·30
17–18	86·80	13·20	4·03	3·02	·54	4·87	·74	6·94	·33	·56	40·55	59·45	30·66	2·30
18–19	86·82	13·18	4·02	3·11	·55	4·78	·72	6·93	·42	·53	41·45	58·55	30·24	2·40
19–20	86·96	13·04	3·88	3·00	·56	4·90	·70	6·92	·40	·55	41·80	58·20	30·39	2·30
20–21	86·72	13·28	4·08	3·00	·53	4·95	·72	6·91	·39	·56	41·50	58·50	30·64	2·45
21–22	86·56	13·44	4·27	3·12	·50	4·81	·74	6·94	·37	·56	40·95	59·05	30·38	2·35
22–23	86·55	13·44	4·18	3·19	·50	4·85	·72	6·89	·33	·55	42·05	57·95	28·98	2·20
23–24	86·72	13·28	4·08	3·12	·53	4·83	·72	6·93	·29	·55	41·45	58·55	29·43	2·35
24–25	86·62	13·38	4·13	3·15	·60	4·80	·70	6·97	·40	·56	41·85	58·15	31·27	2·30
25–26	86·74	13·26	4·01	3·10	·50	4·93	·72	6·89	·36	·57	42·10	57·90	29·87	2·20
26–27	87·00	13·00	3·80	3·09	·55	4·86	·70	6·97	·27	·57	43·95	56·05	28·35	2·00
27·28	86·98	13·02	3·93	3·18	·48	4·66	·72	6·84	·37	·55	42·65	57·35	28·64	2·15
28–29	86·96	13·04	3·98	3·11	·46	4·83	·66	6·78	·35	·55	42·15	57·85	30·82	2·10
29–30	86·84	13·16	4·14	3·10	·51	4·69	·72	6·87	·39	·55	42·20	57·80	31·03	2·10
30–31	86·70	13·30	4·29	3·12	·56	4·67	·66	6·81	·33	·54	42·35	57·65	30·76	2·15
Average	86·87	13·13	4·00	3·08	·51	4·84	·70	6·89	·34	·55	41·66	58·34	30·06	2·25

EXPLANATION OF THE TABLES.

There is little to add to the remarks made last year in explanation of these tables.

Cols. 3, 13, and 15.—It will be noticed that this year the volume of milk in gallons is given in preference to the weight of milk, this being more readily appreciated by the farmer than the weight in pounds, which, however, may easily be obtained by multiplying the number of gallons by 10·3.

Cols. 5, 6, &c. *Temperatures.*—It is necessary to point out that, before the results can be taken as a guide by others, it is essential that the accuracy of the thermometer in use be made certain of. The majority of cheap thermometers are inaccurate, frequently two or three degrees out, and it makes very considerable difference, say in the temperature for renneting, if your thermometer registers 84°, while in fact the milk may be 87° F., or 81° F. Last year I supplied Miss Cannon with thermometers, every one of which was tested against my Kew Standard Thermometer and found to be within half a degree of absolute accuracy, and nearly every pupil attending the school was glad to obtain an accurate instrument. It might greatly promote the cheese-making industry if the Society could see its way to have thermometers tested for cheese-makers at a nominal charge.

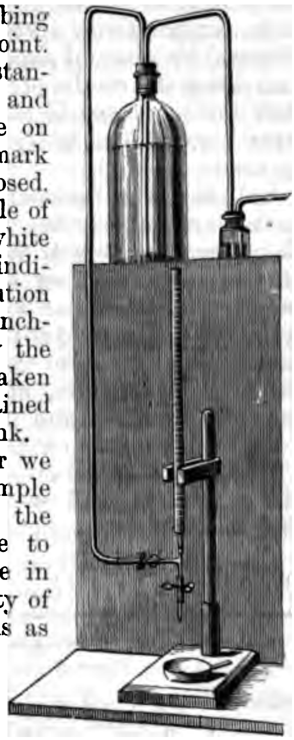
Cols. 7, 11, 14, &c. *Acidity.*—These figures represent the percentage of lactic acid present. The method of conducting these determinations was given in the last Journal. It was then stated that an attempt would be made to find a means of determining acidity capable of being introduced into cheese dairies generally. The apparatus which was set up at the School for this purpose worked admirably during the seven months for which the observations were conducted.

As some of the pupils who learnt how to make the determinations desire to have the apparatus in future, I will give a full description thereof.

The standard solution of caustic soda was contained in a Winchester quart bottle placed on a shelf well above the rest of the apparatus. From this, by means of a glass syphon tube, the solution was brought down automatically to the burette. As this standard solution, if exposed to the air, deteriorates by absorbing carbonic acid, it must be kept in an air-tight bottle. But, unless the air could enter the bottle, none of the solution would syphon over. The air so drawn into the bottle of standard solution was, therefore, first made to pass through a small bottle of strong soda solution, coloured pink, with a few drops of the Indicator Phenol phthalein. This wash-bottle absorbs all the carbonic acid from the air before it passes into the standard solution,

while the moment the solution in the wash-bottle loses its power of absorbing carbonic acid, it also loses its colour. It was found to work admirably, and the strength of the standard solution remained unaltered until used up.

The syphon tube containing the standard solution was attached to the bottom of a burette by a ⊣ joint, and the flow of the solution was stopped by a pinch-cock acting on a piece of indiarubber tubing which connected the syphon and ⊢ joint. Upon opening this pinch-cock the standard solution flows into the burette and carries up the float. When the line on this float corresponds with the first mark on the burette, the pinch-cock is closed. The burette is now full. The sample of milk having been placed in a white porcelain dish, and 3 or 4 drops of indicator added, the standard soda solution is dropped in by opening another pinch-cock attached to the burette below the ⊣ piece, and the quantity of soda taken to produce the pink tint is ascertained by observing how far the float has sunk.



I have often been asked whether we could not get a test for acidity as simple as the thermometer. Once set up, the above apparatus is nearly as simple to work. All that is necessary is care in accurately measuring out the quantity of milk, &c., to be tested, and then it is as easy to read the fall of the float as to read the rise or fall of the mercury in a thermometer.

The temperature of the milk when rennet was added was in nearly every instance exactly 84° Fahrenheit, so that this column has been left out as last year.

Col. 23.—It will again be observed that the proportion of rennet used is smaller in the autumn, when the milk is rich, than in the earlier part of the year when the milk is not of such good quality.

Cols. 31 and 32.—The time which it was necessary to keep the curd in scald was, during the months of April, May, and June, considerable, but decreased after the latter date. I was surprised at the difficulty experienced during those months in obtaining sufficient acidity in the whey before drawing off, and, as a deficiency at this period generally entails subsequent difficulty in obtaining cheese of sufficient ripeness, it is of consider-

able importance that the cause of this should, if possible, be discovered. Subsequently, in my report, I shall again have need to refer to this matter.

Cols. 41 to 45.—In the table of monthly averages, p. 135, the final acidity of the "whey during the treatment of curd" for each day has been averaged, and, on comparing these averages, we again observe the difficulty of obtaining sufficient acidity in the early months of the year. This table, moreover, shows how close, comparatively speaking, is the average degree of acidity obtained by a careful maker throughout the season, though, upon examining the results obtained from day to day, it will be seen that there are considerable fluctuations in the acidity of the whey passing from the curd when that curd is considered by the maker fit to grind.

Col. 46.—The fluctuations in the acidity of the curd when milled are very great, yet I am totally at a loss to explain their cause. It will be seen, upon a careful examination of the tables, that on several occasions, in order to confirm the results, two tests were made in the curd; for instance, April 16–17, June 18–19, 23–24, and subsequently; and the results obtained are so close as to preclude the supposition that the method is faulty, moreover many tests were made which gave absolutely concordant results, and are therefore not duplicated in the tables. Experiments have been made to discover why the curd should on some days show, for example, an acidity of 7·2 per cent., and on others only 3·6, but, up to the present, they have thrown no light on this somewhat difficult problem.

COMPARISON OF AVERAGE RESULTS OBTAINED AT VALLIS IN 1891 AND AXBRIDGE IN 1892.

	VALLIS, 1891.					AXBRIDGE, 1892.				
MONTH.	Vol. of Milk.	Cheese taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.	Vol. of Milk.	Cheese taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.
	galls.	lbs.	lbs.	lbs.	lbs.	galls.	lbs.	lbs.	lbs.	lbs.
April ..	81	73	69	4	·85	79	70	66	4	·835
May ..	119	117	111	6	·93	109	102	94	8	·86
June ..	132	132	123	9	·93	127	122	113	9	·90
July ..	112	114	107	7	·96	116	115	108	7	·93
August ..	91	99	91	8	1·00	100	102½	94	8½	·94
September	79	87½	82	5½	1·04	84	91	85	6	1·01
October ..	52	64	59½	4½	1·14	58	68	62	6	1·07

Cols. 54 and 60.—In order to show the amount of cheese made from the milk and taken to cheese room, and the amount of ripe cheese produced, the table above has been drawn up,

giving, in addition, the weight of cheese in pounds made on an average each month out of one gallon of milk. To illustrate the inferiority of the milk I have inserted in this table the results obtained at Vallis in 1891.

When it is considered that, in a fairly good season, a cheese-maker may naturally expect one pound of cheese for every gallon of milk employed, we see, in a striking manner, how detrimental the past season was, and how small the yield of cheese from the milk employed; while it is well known that the yield of milk itself was in all cases far below the average.

THE RECORD OF ANALYSES OF MILK, &c.

Owing to my being given a special room, which it was possible to fit up as a laboratory, the record of analyses is far more complete this year than it was last. The analyses of the milk during the months of April and May are, however, deficient by not showing the amount of casein and albumin on many occasions. It was found impossible upon these days, in spite of every endeavour, to determine the proportion of casein and albumin by the method of analyses employed on other occasions. Hearing from Mr. Hewitt of the difficulty he had met with, I went to Axbridge, and made many attempts at this time to determine the casein, but without any satisfactory result. Then, from no cause which we could discover, the determinations would be made for a day or two with ease, while soon after, and for three or four days, the same method would utterly fail to separate the casein and albumin in the milk. All difficulty disappeared on the 14th May, and from that date to the end of the experiments the milk was as usual analysed. I cannot explain these facts, but must wait to see whether in the spring of this year a similar difficulty arises, and, if so, I shall devote further study to discover the cause thereof.

The sample of milk was taken for analysis after the evening's milk had been heated and mixed with the morning's, and before any stale whey was added.

The sample of whey was taken after the whole of the whey had been collected in the whey tank, and not, as last year, while the whey was being drawn from the tub.

The sample of curd was taken immediately after the curd was milled and before any salt had been added.

ANALYSES OF WHEY DURING TREATMENT OF CURD.

The following analyses of the whey, taken during the various stages of the manufacture of the cheese, are interesting as giving some idea of the chemical changes which are taking place, and of the stages in the manufacture when fat is most likely to be lost:—

——	August 5.				August 27.			
Percentage of:—	Solids.	Fat.	Sugar, Albumin, &c.	Ash.	Solids.	Fat.	Sugar, Albumin, &c.	Ash.
Whey before breaking ..	6·87	·25	6·09	·53	6·74	·20	6·00	·54
Whey after breaking ..	7·10	·44*	6·08	·58	6·98	·35	6·12	·51
Whey when drawn ..	6·95	·29	6·12	·54	6·93	·27	6·13	·53
Drainings from piled curd	6·66	·04	5·89	·73	6·65	·07	5·93	·65
Whey from curd taken to cooler	7·73	1·13	5·58	1·02	7·67	1·07	5·64	·96
Whey after first cutting	8·22	1·30	5·56	1·36	7·78	1·12	5·51	1·15
Whey after second cutting	8·60	1·32	5·64	1·64	7·81	·95	5·55	1·31
Whey after first turning	..	..	..	..	7·96	·94	5·55	1·47
Drainings from press ..	13·90	1·03	3·89	8·98	13·46	·78	3·78	8·90

* This result is probably too high, as the curd was allowed to settle before the sample was taken, and probably a portion of the fat had risen to the surface during this time.

The above figures confirm the results which were obtained in 1891. They show how, with the development of acidity, there is a constant abstraction of the mineral matter from the curd, and that the chief loss of fat is during the first and second cutting of the curd. Hence the necessity of care being taken in performing this operation.

There are times when a far larger amount of fat than usual comes from the cheese when in the press. This fat rises to the surface of the liquid from the press in the form of an oily layer, and it is impossible to so incorporate it with the liquid as to enable a fair sample to be taken for analysis; the whole of the liquid must be analysed to obtain accurate results.

Time did not permit of this being done in conjunction with the heavy analytical work entailed by these observations, and the consideration both of the amount of fat lost on these exceptional occasions, and of the causes of the loss, must stand over for future investigation.

I am inclined to think the above results throw some light upon one or two questions of scientific and popular interest.

First, we cannot possibly account for the uniform proportion of sugar and albumin in these liquids, and the irregular amounts of ash, without coming to the conclusion that these bodies do not exist in the curd in a similar state.

There is no reason to suppose that the sugar and albumin, which are in solution in the milk, have been rendered insoluble by the processes of cheese-making. And there is good reason to believe that at least a portion of the lime in the milk, if no other ash constituent, is in an insoluble form combined with the casein. If this is so the above results are easily explained. The acid, as it is formed, combines with this lime and withdraws it from the casein, forming calcium lactate. Hence the difference between freshly coagulated curd and cheese might be described by saying that the one was a compound of lime and casein, the other was free casein. But this change will not be limited to the time which elapses between the curdling of the milk and the vatting of the curd. It will also proceed during the ripening of the cheese; and may probably be the chief chemical change which takes place during ripening. This inference is supported by the observations of last year and this. And the calcium lactate so formed in the cheese would supply an admirable food for bacteria, one which would more easily explain the formation of the chemical compounds, upon which aroma and flavour depend, than does the more complex substance casein.

There is another interesting and possible deduction. It is certain that the acid in the human stomach would be even more capable of withdrawing this lime from curd than the lactic acid produced during the manufacture and ripening of the cheese. But anything that tends to neutralise the acidity of the stomach tends to produce indigestion. May there not be then a good chemical explanation of the popular belief that cheese, especially new cheese, is indigestible? I think this suggestion worthy consideration. Moreover, if it contain a truth, may it not account in some way for the diminished favour with which cheese is looked upon as a food by the working man, he being able to obtain only cheese which is almost new, and this opens up once more the economical question as to the advantages of the early ripening methods of cheese manufacture.

Analyses of the Cheeses.

The cheeses for April and May were sold and sent from the School without my taking samples, as I had forgotten to give instructions to the contrary. Some of the cheeses made during the other months have been analysed, and the following table gives the results of these analyses :—

COMPOSITION OF CHEESES.

—	Water.	Fat.	Casein, &c.	Mineral Matter.
June 3	35·25	32·76	28·39	3·60
„ 5	36·45	32·10	27·70	3·75
„ 14	36·95	32·49	26·91	3·65
„ 17	36·25	33·29	26·91	3·55
„ 18	37·00	31·86	27·44	3·70
„ 26	36·35	32·49	27·51	3·65
July 5	37·55	30·52	28·43	3·50
„ 8	38·30	30·80	27·35	3·55
„ 19	35·75	33·32	27·38	3·55
„ 26	36·95	33·21	26·34	3·50
„ 31	36·00	32·59	27·66	3·75
August 5	36·60	33·80	26·05	3·55
„ 15	34·75	31·82	29·38	4·05
„ 16	37·25	32·12	27·03	3·60
„ 19	34·70	34·10	27·55	3·65
„ 22	35·00	33·64	28·16	3·20
September 3	36·60	34·34	25·46	3·60
„ 4	36·05	35·10	25·00	3·85
„ 11	37·85	28·80	29·75	3·60
„ 12	36·85	30·69	28·71	3·75
„ 24	34·85	33·39	27·91	3·85
„ 30	36·50	32·86	26·69	3·95
October 3	35·70	31·72	28·85	3·75
„ 9	38·00	28·20	28·00	3·80
„ 12	38·55	30·08	27·52	3·85
„ 17	33·20	34·37	28·53	3·90
„ 24	36·95	31·68	27·52	3·85
„ 28	37·70	32·34	26·51	3·45
„ 29	36·95	29·25	30·15	3·65

III.—THE BACTERIOLOGICAL INVESTIGATION.

Although the general observations made for the Society have been confined to the seven months, April to October, the study of the bacteria in cheese, which was commenced in 1891, has been carried on continuously from the time of writing my last report to the present, and is still in progress. Under these circumstances it might be thought that a good deal of ground would have been covered and much valuable information obtained. I regret to say that this is not the result. Although much work has been done, it has thrown but little light upon the many and complex questions which have to be solved. This, however, is a very frequent outcome of scientific work, and time and patience are needed to make any progress. My duty,

owever, is to record what has been done, and, if possible, to ıdicate its practical value.

The Milk.—As during 1891, the chief organism present ı the milk has been the Bacillus Acidi Lactici. I have, owever, noticed, or thought that I noticed, some slight varia- ions in the manner of growth of this organism at different eriods of observation. So marked, indeed, has this variation een that it is doubtful whether these organisms are all the ame, or whether there may not be several varieties of the acillus. I have devoted some time to this question and have ccumulated material for its further investigation, but at present m not able to say definitely what the results may be. It is mportant that this point should be made certain, for it may ıelp to explain a fact which has been very forcibly impressed ıpon me during the observations, and which may be proved by tudying the Tables, that at times the development of acidity n the process of cheese-making is far more rapid than at others, even though the initial acidity of the milk was the same and no cause apparent during subsequent treatment for the variation. It is only right to mention that other observers have described several bacteria having, according to their investigations, the power of forming lactic acid.

While last year I was surprised at "the freedom of the milk from other organisms," this year I was troubled beyond measure by the enormous number and variety of other organisms present. Eight of these, which are not known to me as common air impurities, have been isolated and studied; all those which are common having been discarded, as, for reasons stated in my last report, and confirmed by this year's work, there is reason to think they have no effect upon the cheese. But if the foreign bacteria were troublesome, far more so were the moulds invariably present in the milk. Whence they came completely baffled me. The apparatus was most scrupulously cleaned, and every care taken of it. For the most part these moulds were common varieties, with one exception—a white mould, which did not liquefy the nutrient gelatine upon which the organisms are grown for the purpose of isolating and studying them. The more common moulds I have not paid any special attention to for reasons which will appear hereafter. The white mould appeared to be the Oidium Lactis, about which I could find little that was known. Dr. Warming, Professor of Botany at the University of Copenhagen, in his Handbook of Botany, says "it is uncertain whether it causes the souring of milk or not." I determined to set this point at rest. At first, the fungus when grown in milk invariably curdled it, but, upon making a slide of the curdled milk, the B. Acidi Lactici was always present. At

last a pure culture of the mould was obtained, and then it was found to have no curdling effect upon the milk. To prove that the uncurdled milk contained the mould, cultures were made from it, and a growth of the mould was invariably obtained. Although present in the milk so frequently it has not been found in a single cheese, nor can any effect be traced to its presence in the milk. As to its origin:—after many fruitless attempts to discover its source, it was at last found growing abundantly in the earthenware drain-pipe which carried the whey to a receptacle in the farmyard. Here it grew luxuriantly, doubtless contaminating the surrounding atmosphere and so entering the dairy and the milk. It only shows how careful the cheese-maker should be to seek, even at a distance, for causes of contamination which, at first sight, are not easily accounted for, and it proves the folly of allowing, as is often done, the pipe which carries away the whey to open into the dairy.

Taints.—One of the principal objects kept in view during the observations was to determine, if possible, whether the peculiar taints which occasionally arise in the curd during the manufacture of cheese were due to bacteria, and, if possible, to isolate the organisms producing these taints. In spite of every possible endeavour these organisms have so far entirely baffled me. Taints there were on many occasions, and samples of the milk or whey were then most carefully examined, but no organism which, when grown in milk, would cause a taint, could be isolated. Thinking that these taints might perhaps be discernible only as the acidity of the curd increased—for the taint itself is most markèd in the latter stages of manufacture—I decided to inoculate the milk with a pure culture of a definite organism, and see the effect it would produce on a large scale. Two such experimental cheeses were made. The organism was first isolated in a pure state, a culture was then made on gelatine, and after three days—which would allow of considerable growth—the whole of this culture, containing millions of the organism, was transferred to a flask of sterile milk, and kept in the Incubator at a warm temperature for a day or two. The contents of this flask were then poured into the evening's milk as soon as it was in the tub, and well stirred in, the milk being subsequently stirred occasionally during the evening. On the following day the cheese was made as usual, and as if nothing had happened, Miss Cannon, however, taking special care to notice if any difference in the curd, or any taint, could be observed. The results of these experiments were most disappointing; I wanted to make bad cheeses, and I could not. In the first experiment the effect during the

manufacture of the cheese was nil, and when ripe the cheese was excellent; in the second experiment the curd was "rather soft," and the ripe cheese slightly inferior. But there was no taint in either. Upon examining the cheeses when sold I found that the first contained only a few, whilst the second did not contain a single living specimen of the organisms with which the milk had been inoculated. They had been destroyed either in the process of manufacture, or during the ripening of the cheese. It is not necessary to enter into a minute description of the organisms experimented with. At the offset it was necessary to make sure that the organisms were not capable of producing any disease, *i.e.* were non-pathogenic. The difficulty of doing this, except with organisms well known, prevented my making more than two experiments. Moreover, although the Committee had generously given me a free hand to spoil, if necessary for my experiments, any cheeses, yet I naturally wished to damage the quality of the cheeses as little as possible, and, as the results of such experiments could not be known until the cheeses were fit for sale, I determined to err on the right side and not attempt too much. The organism with which the first experiment was made had been found by other workers in sewer gas, by myself in rennet, milk, and cheese; the second experimental cheese was inoculated with the Bacillus Subtilis. This organism is known as the hay bacillus, and my reasons for selecting it were, that it was frequently present in the milk; that at the time when the hay was being carted home taints were more frequent than at other times; and that taints appeared to be more frequent when the wind was in a certain direction, which was also the direction of the hayrick. Although these experiments have given only negative results, yet the attention of all cheese-makers may be drawn to the apparent fact, that taints appear more frequent when the wind is in one quarter than when in another. This being due probably to the wind then passing over some source of contamination. If cheese-makers would systematically observe whether this happens with them, it might materially help in the discovery of the causes of taints.

The Cheeses.—It has only been possible to examine comparatively few of the cheeses when fit for sale. The method has been as follows:—

(*a*) A portion of the cheese is taken, and a slide made for microscopic examination in the manner described in the report of last year.

(*b*) A portion of the cheese is transferred to a sterile salt solution in a test tube, broken down into a fine paste with a little of the salt solution, and then shaken with the remainder to

insure equal distribution. From this solution three minute portions are taken, with which—

1. A test tube of sterile nutrient gelatine is inoculated, and with this a plate culture is made.

2. A test tube, containing sterile milk, is inoculated with a minute portion of the liquid.

3. A second test tube, containing sterile milk, is inoculated as the first, and upon the top of the milk about one inch of melted and sterilised vaseline is carefully poured.

In No. 1, colonies are obtained of all the aerobic organisms (*i.e.* those which require air or oxygen) still living in the cheese. No. 2 shows whether the cheese contains the B. Acidi Lactici or any other organism capable of curdling the milk. And in No. 3 all those organisms in the cheese which are not capable of growing in the air, and are therefore known as anaerobic, grow, and can be studied.

As to the results obtained; a careful examination of the slides prepared direct from the cheeses (*a*) showed that the chief organisms present, or those in greatest abundance, were, a large round organism (a micrococcus), a stumpy bacillus, larger than the B. Acidi Lactici, though in other respects very similar, and here and there a few long thin rod Bacilli. There were also some few other forms present, but only occasionally, and apparently in uncertain numbers.

Next as to the various cultures; the plates (*b*, 1) are distinguished from those prepared from the milk by this striking fact, that no organism is invariably found. Some will contain one variety of organism only, others two or three, and some several. Two varieties stand out prominently as far more frequent than any others. The one is a large stumpy bacillus, which has been found so frequently that I have named it "the cheese organism," the other is the large micrococcus seen in the cheese slides, and which for the present may be styled "the cheese micrococcus." Both of these will be preserved until the cheese-making season returns, when I hope to be able to make some experimental cheeses from milk inoculated with them. In some of the plate cultures other organisms are found, but they are quite exceptional, and must be considered for the present as accidental and not essential.*

But the most remarkable point about these plate cultures is that I have not been able to find in one the B. Acidi Lactici, which last year was the organism most noticeable in the cheeses. There is also another result quite unexpected.

* The long thin rod bacilli form no growth on the plates, showing that they are anaerobic organisms.

In spite of the trouble caused by the presence of moulds in the milk, from which the cheeses were made, yet in the cheeses themselves it was very rare to find the least sign of mould; and, in the few instances where mould has shown itself, I attribute it to accidental impurity, due to the great difficulty of obtaining cheese cultures without more than ordinary exposure to the air. Hence the well-known tendency of cheese to "go mouldy" must be attributed solely to its forming an admirable feeding ground for the moulds which fall upon it from the atmosphere.

A second result is this:—the older the cheese the fewer the aerobic organisms found. Anxious to discover the causes of taints, I was not content to confine my attention to the cheeses made at the School, but thought, by studying tainted cheeses, to come upon some of the causes thereof. The late Rev. J. Constable, who took great interest in these observations from the first, sent me a sample of cheese which far surpassed in abomination any I have ever tasted. In this cheese not a single aerobic organism could be found. This points to one of two conclusions, which are important. If a taint is caused by an aerobic organism it evidently remains long after its cause has been destroyed, and is therefore due to the formation of a definite chemical compound. Here then is a new field for chemical research. But it may be that these taints are due to the action of anaerobic bacteria, and this would account for my failing to discover them. Are there any well-known facts to support this supposition?

The cheese-maker finds that if there is a taint it is well to open up the curd as frequently as possible, thus allowing the air to get to it and forward the growth of acidity; and it is generally recognised that the sooner a tainted cheese is sold the better, for the taint augments with keeping. Both of these facts support the view that taints are due to organisms which do not need air for their growth and development.

The milk tubes inoculated from the cheeses (*b*, 2), to my great surprise, did not curdle. They were carefully watched, and after several weeks showed signs of becoming thick, and finally some curdled completely, others partly. But the time which had elapsed proved that this action could not be due to the B. Acidi Lactici. Slides were now prepared and carefully examined microscopically, and "the cheese organism" and "cheese micrococcus" were found in abundance; but far more striking was the presence of the long thin rod bacilli. This showed that the cheese organisms, having consumed the oxygen available in the milk, had enabled the anaerobic organism to flourish. Curiously enough the acidity of these milks was found to be 0·98 per cent., of which only 0·04 per

cent. was volatile. Hence these rod bacilli do not appear to be the Butyric Acid organism. Explanations for these observations will probably be found in time, but my work is not yet far enough advanced to permit of my even stating those which occur to me.

Lastly, there is one fact to record with regard to the results of the study of the anaerobic organisms in the tubes covered with vaseline (*b*, 3). The milk in these tubes invariably curdles. But in some a large volume of gas is evolved, and the plug of solid vaseline is forced up into the tube sometimes to the very top thereof, or until an irregularity in the sides of the tube allows the gas to pass by. This formation of gas does not take place in every tube. Last year it arose only in one or two; this year it was more frequent. Now the cheeses this year were more liable to "puff" than last; hence I attribute the cause of this puffing to an anaerobic organism which has yet to be isolated. If the study of bacteria is difficult when only aerobic organisms are concerned, it is infinitely more difficult when the anaerobic bacteria need to be examined, and it will probably require years of work to make much headway.

The cheese-maker may not unnaturally ask, what is the practical good of all this study? At present little, I grant. But one thing it does show, that the troubles to which cheese-makers are liable may be chiefly due to causes which do not come in at the open window or door of the dairy, but hide in out-of-the-way crannies where no breath of air even may enter, but where a little decomposing milk, or other animal or vegetable matter, may supply all the food which these organisms need to enable them to live and grow and multiply.

IV.—The Experimental Cheeses.

The Committee having given me permission to carry out any experiments desirable, a certain number of cheeses were made with the twofold object of throwing light upon the problems, and of answering the questions which arose during the course of the observations. The following is a detailed account of these experiments.

1*st Experimental Cheese.* 30–31st May.—In the month of May there appeared much difficulty in getting the curd sufficiently ripe for vatting before a late hour in the evening. The object of this experiment was to determine whether it were possible to carry out the principles laid down in the report for 1891. It is therein shown how "the development of sufficient acidity in the whey during second scald, before allowing the

curd to settle prior to drawing the whey off, appears to exercise considerable effect upon the time when the curd will be fit to grind," and also "that if the acidity of the whey when drawn is less than that of the mixed milk before renneting, the subsequent development of acidity in the curd will be very slow, so that the curd will not be vatted until late in the evening." Now, upon referring to the table of observations for May 1892, it will be seen that the average acidity of the whey was lower than the average acidity of the milk before renneting, and this, coupled with the late hour of vatting, confirms the statement in my report for 1891. During this month, however, several cheeses were put away comparatively early.

The following table gives the acidity of the milk and whey on those dates, and, by the side, the figures for those days on which the cheese was put away later than usual. By comparing these tables it will be seen that the principle laid down holds good, though, in individual cases, as pointed out in my former report, exceptions may be found.

INFLUENCE OF ACIDITY OF WHEY ON TIME OF VATTING.

Date.	Acidity in Milk.	Acidity in Whey.	Time of Vatting.	Date.	Acidity in Milk.	Acidity in Whey.	Time of Vatting.
			P.M.				P.M.
May 6 ..	·21	·25	4.10	May 17 ..	·23	·17	10.0
" 18 ..	·22	·20	4.40	" 10 ..	·22	·19	9.57
" 21 ..	·22	·21	5.0	" 13 ..	·23	·18	9·50
" 19 ..	·21	·20	5.15	" 5 ..	·21	·18	9.50
" 15 ..	·22	·19	5.25	" 24 ..	·24	·19	9.45
" 12 ..	·22	·22	5.30	" 22 ..	·24	·20	9.35
Average ..	·21	·21	5.0	Average ..	·23	·19	9·50

The acidity of the mixed milk on the 31st May was ·23; after cutting, ·15; before breaking, ·16; after first scald, ·17; at commencement of second scald, ·175. The scald commenced at 9.40, and the second scald was in at 10.20, and now a most tedious operation was gone through in order to fulfil the conditions of the experiment, and obtain in the whey, before the curd was allowed to settle, an acidity higher than that of the mixed milk. The acidity of the whey rose most slowly, taking about twenty minutes for a rise of ·01 per cent., so that it was not until 12 o'clock that the whey showed the desired acidity of ·24 per cent.; then the curd was allowed to settle, the time in scald having occupied 2 hours and 35 minutes. Nevertheless, from that moment the acidity progressed rapidly, and the result was that, in spite of this long and tedious process in the

morning, the curd was fit to grind at 5.35 P.M. Only six cheeses during the month had been vatted at an earlier hour.

2nd Experimental Cheese. 16–17th June.—This was made to determine the effect of a higher scald. The milk was treated exactly the same as usual up to the time of the first scald. For the second scald it was raised to a temperature of 95°. The acidity of the mixed milk was ·23 per cent. The acidity of the whey after first scald was ·17, and at the commencement of the second scald ·175. It rose very slowly, and had not reached the desired amount of ·24 per cent. until 12.6, having been in scald 2 hours 35 minutes. When the whey was first drawn it showed an acidity of ·25 per cent., but when the whole had been drawn it showed an acidity of ·27, proving that the formation of acid had been going on within the curd, and had not shown itself in the whey. This is confirmed by the acidity of the drainings from the piled curd and the rapid development of acidity afterwards. The curd was vatted at 4.49 P.M., was very dry (as shown by the small loss in press as well as by analysis), and lost considerably in the cheese room.

Judging the curd by the sense of touch, Miss Cannon considered it should have been allowed to settle in the whey at 11.10 A.M., or nearly one hour before the acidity of the whey had reached the standard which was desired. Hence it is probable that heat produces a contraction of the curd similar to that produced by acid. But this is not certainly proved by this experiment, as it is doubtful how much acidity had been produced within the curd.

3rd Experimental Cheese. 25–26th June.—The result of the preceding experiment having pointed to a higher scald promoting the manufacture of the cheese, perhaps this might be adopted in the earlier months of the year with advantage. But the quantity of fat in the whey on the 17th was very great, and undoubtedly due to the long stirring in scald. It was therefore determined to make another experiment with a high scald, but to allow the curd to settle in the whey instead of keeping on with the stirring.

Moreover, as it had been shown that the acidity developed in the curd was not recognisable in the whey, it was not deemed advisable to wait until the whey showed a higher percentage than the mixed milk, but one a little under.

The acidity of the mixed milk was ·22 per cent.; of the whey at the commencement of the second scald, ·17 per cent.: this was at 10.45 A.M. At 11.5 stirring was stopped, and the acidity was then ·19 per cent. It rose very slowly, and at 12.15 reached ·21 per cent. only. The whey was then drawn, and it will be seen that the acidity of the mixed whey was as

high as ·23 per cent. But even this does not give any idea of the acidity which was in the curd, and it is only when the drainings from the piled curd were tested, giving ·45 per cent., that we saw how great that acidity was. Miss Cannon considered the curd tasted and smelt far more acid than it ought to. But the subsequent acidity determinations in the whey from curd did not indicate this high acidity. That Miss Cannon was right, however, there can be no doubt, for the cheese when sold was considered far too acid by Mr. Hill.

4th Experimental Cheese. 7–8th July.—This was an attempt to discover to what extent a cheese is affected by not developing so much acidity as usual; and, on the other hand, by developing more acidity than usual. The cheese was made by Miss Cannon in the usual course, but half the curd was vatted after the first cutting, when the acidity of the drainings had reached ·71, and the second half when the acidity of the drainings reached ·97. This experiment was not a success. The highest acidity of the drainings is not so high as the average of the month (1·00 per cent.), and the lowest is not so low as the drainings from some of the cheeses made in April. The Committee having given me permission to take these cheeses to illustrate a lecture at Wells, they were there tasted by many people, and considerable difference of opinion was expressed as to their merits: some considered the one with least acidity the better; others, the one with most acidity. There was, in fact, but little difference between them, showing that some latitude is possible as regards the acidity of the drainings from curd before it is put in the press. But there is another aspect of this fact, and one of considerable importance. Both these cheeses were tasted by Mr. Hill some weeks before the lecture, when the cheese with the least acidity was considered "inferior," and the one with the highest acidity "better, but not prime." Further keeping at a proper temperature appeared to have improved them both. Perhaps it was most marked in the one with least acidity. Can we account for this by the assumption that, in keeping, the acid required had been gradually developed and had given those qualities to the cheese which it lacked at an earlier stage?

5th Experimental Cheese. 18–19th July.—The curd was scalded to 100° F. in two scalds. When the scald was on, the whey showed ·18 per cent. of acidity. The curd was stirred in scald for five minutes, and then allowed to rest for thirty minutes. The acidity of the whey standing on curd was ·20. The acidity of the whey when drawn was ·22. But the drainings from the piled curd showed, as before, a high acidity. The curd was broken up and spread on rack in cooler, covered with a cloth, and no weight put on. The drainings came away pretty

freely, and the curd held together well. There was rather a small weight of cheese, but it was considered a good cheese by Mr. Hill. It is now evident that with a high scald it would be necessary to completely alter the system of manufacture, and that the conclusions laid down in my report of 1891 do not hold good, except for a cheese which is made in the manner adopted by Miss Cannon. On referring to the analysis of the whey, it will be seen that there was no rise in the amount of fat due to the high scald, evidently because stirring in the whey had not been adopted. It is probable that, with milk of the quality yielded by the animals this year, it was more difficult to make a good cheese when employing a high scald than with a lower one. Or it may be that there are other conditions necessary to be observed—such as the use of less rennet—when a cheese is made by this system. These points can only be answered by systematic observation and experiment in the future.

6th Experimental Cheese. 30–31st July.—The rise in acidity had been so rapid, and had gone so far, in the preceding cheeses when a high scald was used, that to prevent it no sour whey was employed for this cheese. The scald was raised to 100° F. as rapidly as possible, being first raised to 89° F., and then to 100° F. Stirring lasted for five minutes only, and the curd was then allowed to settle and remain in scald for twenty-five minutes. The whey, when stirring was finished, showed acidity ·17 per cent., and when drawn it was still ·17. So far the object of making a cheese with high scald and low acidity had been attained. The curd was piled for thirty-seven minutes before the whey commenced to drop, was then cut into 6-inch cubes, taken to cooler, and laid out thereon. The acidity of the first drainings was very slight. The curd was turned, allowed to remain one hour and again turned, when the acidity of drainings was ·42. It was late in the evening before the acidity of the drainings was sufficient to justify vatting the curd, and a very poor cheese it made—"tough and no flavour" was the judgment of Mr. Hill. So that keeping down the acidity proved worse than obtaining too much. This indicates how necessary the development of acidity is for the production of a good cheese, and that contracting the curd by heat is not alone sufficient. Here we get the first indication of the cause of the comparatively inferior quality of spring cheese. It will subsequently be shown how difficult it is to obtain sufficient acidity in the whey and curd during the months of April and May. The chemical action which this development of acidity insures has already been dwelt upon, also its influence from the bacteriological point of view.

7th Experimental Cheese. 14th August.—Now that the same

time of year had come round as that at which observations were made at Vallis in 1891, it was thought advisable to once more make a cheese guided solely by the determinations of acidity. This was done, and the results confirmed the conclusions of 1891.

But there was one important difference. Although the conditions were so similar to those in 1891, and the curd was vatted when the drainings showed even less acidity than in that year, yet the opinion of Mr. Hill on this cheese was—"of very good flavour, *but a little too acid.*"

While this cheese was being made, I had a suspicion that it was not all that might be desired, for in my note-book are the following remarks made at the time: "It is possible that with lower quality of milk it is not so desirable to obtain so much acidity as with richer milk."

8th Experimental Cheese. 14–15th August.—Now, as the contraction of the curd can be brought about by heat, it may be possible so to obtain the necessary dryness of the curd without developing so much acidity; and, if the quality of the milk affects the result, perhaps an equally good cheese may be made. The curd was scalded as quickly as possible to 101° F., stirred for five minutes, allowed to settle for twenty minutes, and the whey drawn. When taken from the tub, the curd was cut into blocks, spread out on the rack in cooler, covered with a cloth, and, while the drainings were still low in acidity, the curd was ground, salted, and spread out to cool. It took 2½ hours to cool, during which time the acidity rose rapidly, so that the liquid from press was more acid than usual. This, however, turned out to be an "excellent cheese."

9th Experimental Cheese.—This was one of the inoculated cheeses referred to in the bacteriological observations.

10th Experimental Cheese. 17–18th August.—The object was to determine whether, when no sour whey was used, and the temperature of scald was the same as usually adopted by Miss Cannon, the sense of touch would give to her the same indication of acidity as when she used sour whey. Miss Cannon considered the curd firm enough to allow stirring to be stopped at 11.45 A.M., the acidity of the whey being then only ·18 per cent. It is thus evident that when no sour whey is used, and there is consequently a deficiency of acidity in the milk before renneting, the toughness of the curd in scald is brought about by heat before the requisite amount of acidity has been developed. This explains much of the difficulty which the cheese-maker finds in the spring of the year. How it is to be overcome is certainly a problem which deserves further study.

11th Experimental Cheese. 18–19th August.—The same conditions exactly as on August 18th were observed, except that

sour whey was used. Now the sense of touch and the acidity determinations agree.

12th Experimental Cheese.—This was the second inoculated cheese referred to in the bacteriological portion of this report.

V.—THE RESULTS OF OBSERVATIONS.

A. *The Conditions essential to the Manufacture of a Cheddar Cheese of High Quality.*—The results of the observations in 1891 led me to the conclusion that "the fitness of the curd to settle in scald was coincident with the whey obtaining an acidity slightly greater than the acidity of the milk before renneting." The question now naturally arises, how far have the observations of 1892 confirmed those of 1891 in regard to this point? Speaking generally, they have completely confirmed them; but this statement holds good, more especially in the months of June, July, August, and September, rather than in the earlier and later months. In fact, the conditions which exist in the early months appear to be totally different to those which exist during the months June to September, and to give rise to difficulties which require special means to overcome. Nevertheless, confining my remarks solely to the method of manufacture adopted by Miss Cannon, I think there can be little doubt that the condition of the curd in whey, which the practical cheese-maker judges by the touch, is really a condition brought about by a development of acidity. It is here, however, important to point out—what the experimental cheeses prove—that a similar condition may be produced without the development of acidity. What the development of acidity does is to contract the curd, and thereby expel the whey. This same contraction of the curd may be produced by heat, and the whey expelled without there being a simultaneous rise in the development of acidity. Instances of this have already been quoted, but the following figures are striking. The moisture in the curd when taken from the tub was determined on many days, and the following figures relating to two of the August cheeses are interesting. The acidity of the curd at this stage must be estimated by the acidity of the drainings from piled curd:—

—	Temp. of Scald.	Time in Scald.	Acidity of Drainings.	Moisture in Curd.
		h. m.		
August 14	90°	1 50	·38	47·45
„ 15	101°	0 40	·38	41·45

It is well known to Cheddar cheese-makers that there are two systems of manufacture which stand out from all others, inasmuch as those who adopt them have obtained special eminence at the Dairy Shows of the country. The one is that adopted by Miss Cannon, the other that adopted by Mr. Candy. They differ in this respect; that whereas in Miss Cannon's method the extraction of the whey from the curd is obtained by the development of acidity, in Mr. Candy's method the extraction of the whey from the curd is obtained by the high temperature of the scald. It is desirable that the changes and conditions which arise in the manufacture of Cheddar cheese on Mr. Candy's system should be studied, as they might probably throw considerable light upon the many chemical problems which are concerned in the manufacture of Cheddar cheese. Judging from the data given above, the development of acidity in Mr. Candy's system is not so rapid as the contraction of the curd, so that when the maker would consider the curd sufficiently tough to be allowed to settle in whey, prior to drawing the latter off, there would be but a small amount of acidity present. Nevertheless the subsequent development of this acidity in the curd when on the cooler would be more rapid, owing to its having a much higher temperature than with the Cannon method.

Thus the conclusion arrived at in the Report of 1891 holds good, solely when the other conditions are such as described in that report. And those makers who adopt any other system cannot take the same standard of acidity as will hold good for those who adopt the Cannon system of manufacture.

A Standard of Acidity for the Whey.

In my last report I stated that the acidity of the whey, before the curd was allowed to settle prior to drawing off the whey, should be ·01 per cent. higher than the acidity of the mixed milk. Now it will be seen that the acidity of the mixed milk varies greatly during the season. Thus, in April, it averaged ·17 per cent.; in May, June, and July, ·22; in August and September, ·23; and in October, ·225.

The question therefore arises, should the acidity of the whey in the spring be ·01 above ·17, *i.e.* ·18, and in the autumn ·01 above ·22, *i.e.* ·23? Again, on some days in the same month, we find that the milk before renneting has an acidity of ·20, and on others of ·24. Ought the acidity of the whey on the one day to be ·21, and on the other ·25, or is it possible to lay down a standard for the acidity which the whey ought to attain before it is allowed to settle? This problem may be approached in many ways. First, let us determine for each month the

average acidity of the whey of the cheeses vatted at different hours. This is shown in the following table:—

TABLE SHOWING TIME OF VATTING AND AVERAGE ACIDITY OF WHEY WHEN DRAWN.

—	Cheeses Vatted.									
	At or before 3 P.M.		4 P.M.		5 P.M.		6 P.M.		7 P.M.	
	No.	Average Acidity of Whey.	No.	Average Acidity of Whey.	No.	Average Acidity of Whey.	No.	Average Acidity of Whey.	No.	Average Acidity of Whey.
April ..	none	..	3	·17	none	..	4	·185	5	·18
May ..	none	..	none	..	2	·225	7	·21	1	·20
June ..	none	..	3	·23	5	·24	13	·22	4	·22
July ..	none	..	16	·22	8	·21	7 after 5	·18	..	..
August ..	5	·24	13	·22	7	·21	6 " 5	·18	..	..
September	13	·20	8	·195	8	·19	1	·17	..	..
October ..	none	..	6	·21	6	·20	6	·18	12 after 6	·18

We see at a glance how the time of vatting depends upon the acidity of the whey when drawn, and also obtain a fair idea of the amount of acidity in whey which is best calculated to produce an early cheese in each month. We have an explanation of the late time of vatting in April and May, and, to a certain extent, of the early vatting in the months of August and September. From a careful perusal of this table, one is forced to the belief that, whatever the acidity of the milk may be, it is not necessary to develop more acidity in the whey when drawn than ·22 per cent. So that I would now slightly modify the conclusion come to in 1891, and say that it is advisable, when possible, to obtain in the whey an acidity of ·22, and not necessarily of ·01 per cent. more than was present in the mixed milk before renneting.

Let us now look through the tables and see if, with a higher and lower percentage of acidity in the mixed milk before renneting, the development of this amount of acidity in the whey has resulted in the production of an early or late cheese.

In April this amount of acidity was only obtained once, viz., on the 30th, the acidity of the milk before renneting being ·20, and the cheese was one of the earliest vatted during the month. In May it was obtained on the 11th, 12th, 14th, and 27th, the acidity of the milk being on these days ·22, ·22, ·23, and ·23 per cent., and the cheeses were vatted at 8.20, 5.30, 5.40, and 8.45 P.M., which, as may be seen by the preceding table, was fairly good.

In June this amount of acidity in the whey was obtained on several occasions, and, in most cases, the cheeses were fairly early. On the 12th we have the first example of the milk showing an acidity of ·24 or ·02 per cent. above that of the whey, yet the cheese, though later than usual, was not very late. In fact, it was vatted at exactly the same time as the cheese of the 25th, which had the same acidity in the whey, and only ·21 in the milk before renneting. It is during these three months that the cheese-maker has the greatest trouble in getting the curd vatted in reasonable time, and this amount of acidity in the whey, no matter what may be the acidity of the milk before renneting, seems to ensure an early cheese. A careful examination of the tables shows that in other months, even in October, which is also a difficult month, ·22 of acidity in the whey ensures the curd being vatted early.

To obtain this amount of acidity in the whey it will not be necessary to continue stirring in scald until the whey shows more than ·20 per cent. of acid, for I find, on referring to my notes, that, as a rule, the acidity of the whey when drawn is ·02 per cent. above what it was when the curd was allowed to settle.

Experiments have shown that to obtain this amount of acidity in the whey will at times be very difficult, especially when the acidity of the milk before renneting is very low, as in the months of April and May, and sometimes even in June. One cause of this want of acidity in the mixed milk will be the exclusion of sour whey, owing to there having been a taint in the previous day's cheese. In such a case, the first thing to do is to keep the evening's milk at a higher temperature than usual, so as to develop the utmost acidity possible. And it appears to me that in the early months of the season it is most necessary to keep the dairy as warm as possible; in fact to obtain artificially the conditions which are natural in August, during which month the average temperature of the dairy during the night was, min. 64°, max. 66°. Even then it may not be possible to obtain the milk sufficiently acid, and in that case probably the best plan will be to raise the temperature of the scald; there are, however, difficulties in the way of doing this which have been pointed out already, and which require further study.

If, however, the sour whey is capable of being used, why should not sufficient be used to give the necessary acidity? In the first place, we must determine what is the amount of acidity desirable in the mixed milk before renneting? For reasons already fully given, I should say ·01 per cent. below that desired in the whey, or ·21 per cent.

It is said by the practical cheese-maker that it is not possible

to use more than a limited quantity of sour whey wit damaging the quality of the cheese. Otherwise the neces acidity might be obtained in the mixed milk by means of sour whey. I can well understand that it is not possible t sour whey in sufficient quantity to make a sensible differen the acidity of the milk. For supposing the milk had an ac of ·18 per cent., and the sour whey an acidity of ·36 per it would require 15 gallons of such whey to raise the ac of 80 gallons of milk to ·21 per cent. Such a quantity cert could not be used. But I would point out that in the months, and again in October, the sour whey does not a that degree of acidity which it does in the months of July August. (See Table of Averages.) And this points to a of heat in the dairy, and the necessity of supplying it artifici if only to the sour whey.

One other method would be to inoculate the milk with bacillus of lactic acid. It may be found that this can be by adding a little sour whey to the evening's milk, and subject deserves investigation.

Acidity of Curd before Grinding.

The second conclusion of importance to which the obs tions of 1891 led was that "the acidity of the whey which d from the curd when in the cooler is a sufficiently accurate g to the condition of the curd before grinding." The obs tions of 1892 confirm this conclusion, though there are one or points which still remain to be explained.

Now arises the most important question, What should acidity be?

In the first place, let me compare the cheeses made in Au September, and October of 1892 with those made in the c sponding months of 1891. It will be best to at once Mr. Hill's opinion of these cheeses. Of the August cheese says, August 2nd, "richer curd, really nutty flavour, and e lent." And he selected the cheeses of the 15th, 24th, and as all being very good. Now, from the Record of Observat we find the following acidity in the drainings from the before it was ground, on these days. On August 2nd, ·90 the 15th, ·65; on the 24th, ·87; and on the 31st, ·89 per c the average acidity being, ·83 per cent. But the cheeses on the 9th and 14th of August, and having an acidity in drainings from curd before grinding of ·94 per cent., were sidered too acid. In September, the best cheeses were tho the 3rd, 11th, 21st, and 23rd, the acidity of the drainings

curd being ·92, ·91, ·92, and ·93 per cent., or an average of ·92 per cent.

Now, upon referring to my notes of 1891, I find that the best cheeses in August had an acidity of ·94 in the drainings from curd; that one with an acidity of ·84 was not so good; and that even a cheese, the drainings from which had shown so high an acidity as 1·07 before vatting, was better than one which only showed an acidity of ·84 per cent.

Evidently then what held good in 1891 did not hold good in 1892. Take again the September cheeses. In 1891, those which had a high acidity in the liquid from curd before grinding, were better than those which had a low acidity; the best ranging from ·95 up to 1·10 per cent. There must evidently be some distinct cause for this difference between the cheeses of 1891 and 1892. My opinion is that this difference is due to the quality of the milk, and that the high acidity is only permissible when the milk is rich in fat. From the preceding facts it will be seen that the acidity, which in 1891 was capable of giving a good cheese in August, did not give a good cheese in 1892 until September. Let us compare the milk of August, 1891, with that of August and September, 1892. The results are as follows:—

—	Solids.	Fat.	Casein.	Ash.
Average composition of Milk, Aug. 1891	12·61	3·87	2·76	·77
„ „ „ Sept. 1892	12·56	3 57	2·87	·66
„ „ „ Aug. 1892	12·28	3·38	2·65	·68

It will be seen that the milk of September, 1892, compares with that of August, 1891, far better than does that of August, 1892. If then the amount of acidity which may be produced with advantage in the curd, as indicated by the acidity of the drainings before vatting, depends upon the amount of solids and fat in the milk, *i.e.* upon the quality of the milk, we should expect the amount of acidity permissible in the earlier months of the year to be even less than in August. Upon referring to my notes of Mr. Hill's opinion on the cheeses, I find as follows:—"Mr. Hill considers the cheeses generally to be a little too acid, but of good flavour." In June "the cheese of the 3rd (acidity of drainings 1·01) was too acid," that of the 5th (·91) "better than 3rd," and that of 7th (·82) "good."

It would not be fair to overlook the fact that there were ex-

ceptions to this rule, and that some of the cheeses of higher acidity were of good quality. Moreover, I noticed that a high development of acidity was more generally associated with the "nutty" flavour than was a low acidity. So it would seem somewhat difficult to say when the acidity was too great, and likely to produce an acid cheese.

Of the July cheeses, those of the 5th and 26th * were very good. And yet the acidity was greater than in the best cheeses of August, being ·94 and 1·00 per cent. respectively.

While all the evidence seems to point to the fact that the degree of acidity which may be obtained with advantage, depends upon the composition of the milk, it is more difficult to say why this is so. In the examples already given, it is seen that the fat is the factor in which there is most variation. But we should naturally expect that the amount of acidity would depend rather upon the amount of mineral matter in the milk than upon the amount of fat. Upon comparing the analyses of the milk at Vallis in 1891 with that of Axbridge in 1892, it is striking how much more mineral matter the former has. The results are as follows:—

—	August.	September.	October.
1891 Vallis	·77	·78	·77
1892 Axbridge	·68	·66	·70

And again, if we refer to the analyses of the milk for June and July of 1892, we see that the mineral matter is then higher than in the later months, being ·73 in June and ·72 per cent. in July. This might account for the fact already mentioned, that in the months of June and July a higher acidity seemed permissible than in the later months. Whether it be due to the proportion of fat, or to the proportion of mineral matter in the milk, future investigation can alone prove; but one thing seems certain, that the quality of the milk affects most seriously the amount of acidity which may with advantage be obtained in the curd before grinding.

But the quality of the milk will itself depend largely on the nature of the soil and pasture, and so we begin to see into the probable cause of the difficulty, which has always been found on strong land, in making a good cheese. For strong land has a tendency to produce larger quantities of milk, but milk of poorer quality both as regards fat and mineral matter, than

* The milk on this day was exceptionally rich in fat.

lighter and more lime-containing soils. What, then, is the remedy? The observations and experiments of 1892 seem to point to its being found in keeping down the acidity in the curd before vatting, in keeping the cheeses in the ripening-room for a longer period than would be necessary with cheese from better land, and in taking care to maintain the temperature of the cheese-room at a uniform and higher temperature than would be necessary with the richer cheese.

While I state fully the facts that have been obtained, yet I do not feel in a position to draw conclusive and practical deductions therefrom.

The Time required to Make a Cheese.

This being, to the majority of cheese-makers, one of the most important considerations, it is well to refer to it again. There is little to add to what was said in the Report of last year beyond what has been already stated in the body of this Report, and those who may not have read it I would refer to the tables given on pp. 191, 198. If there is one point which these observations have conclusively proved, it is this: that the time required to make a cheese depends upon the amount of acid formed in the whey when it is drawn.

Loss of Fat in Cheese-making.

One of the questions to which an answer was sought, was: To what extent is the fat originally present in the milk lost during the manufacture of a cheese, and what proportion of that loss falls upon each operation?

The following table, though it does not entirely answer the question, gives some interesting facts:—

Fat present in—	Weight of Fat in pounds.	
	August 5.	August 27.
Milk	39·66	33·11
Curd	37·07	30·60
Whey	2·79	2·14
Drainings from cooler ..	·12	·15
Total found	39·98	32·89
Error of Analysis	·32	·22
Fat in liquid from press ..	·11	·06

The errors in the examples I have here given, taken from several sets of analyses made to determine this question, are slight. In other cases I find greater divergence, due to the fact that lactic acid is estimated with and reckoned as fat, and, unless special precautions are taken to correct this, there appears to be more fat in the curd, &c., than was actually present in the milk. To this fact may probably be due the notion which was, and is, in some cases, even now held, that in the ripening of cheese fat is formed.

Summary of Conclusions.

For the benefit of those who may not have the time to go through this somewhat long and necessarily somewhat technical report, I will attempt to briefly state the conclusions which the observations of 1891 and 1892 appear to justify.

1. The quality of milk varies on the same farm each year, owing to the season, and on the same fields each month, owing to the food. It varies on two farms during the same year, and on each has a characteristic composition due to the nature of the soil.

2. The quality of a cheese, assuming that the manufacture was conducted by a skilled maker, depends largely on the quality of the milk from which the cheese was made.

3. The manufacture of a cheese must also vary in accordance with the varying quality of the milk. Not only is this true as regards the quantity of rennet to be used, but it influences the degree of acidity which may with advantage be obtained in the curd before vatting.

4. On good soils and with rich milk a high acidity in the curd is desirable; but on heavy land yielding poor milk a low acidity is desirable.

5. A cheese made with low acidity requires longer to ripen, and probably a higher temperature than a cheese with high acidity.

6. In the spring the temperature of the dairy should be maintained artificially at from 64° to 66° Fahr.

7. In order that the curd may be put away in good time, it is essential to obtain sufficient acid in the whey before drawing it off.

8. The acidity of the mixed milk, &c., before renneting should, if possible, be ·21 per cent., and of the whey in the tub before drawing, ·20 per cent., so as to insure in the whey when drawn an acidity of ·22 per cent.

SUGGESTIONS FOR THE FUTURE.

Should it be deemed desirable to continue these observations and investigations in the future, I would suggest that the following course should be pursued:—

1. That a laboratory be fitted up at the school as last year, but before the commencement of the cheese-making, so that the work might commence with a knowledge of the composition of the milk to be dealt with. Also of the various feeding stuffs employed with a view of determining, in the future, how far certain foods affect the quality of the cheese.

2. That during April and May the chief consideration should be to experiment on the best means of promoting the manufacture of the cheese and the effect of varying degrees of acidity in the curd on the product. Also that experiments be started on the effect of keeping these cheeses at various and fixed temperatures.

3. That further experiments be made to try to elucidate some of the points still unanswered, and any others which may arise under new conditions.

4. That if possible one or more systems of making Cheddar cheese, as adopted in the county, should be studied.

5. That if any maker, within reasonable distance of the school, should meet with any difficulty, and be desirous of my investigating the same, and willing to afford the necessary facilities, I should be empowered to visit such Dairy for the purpose of investigation. By this means the school might become each year a centre of investigation for the district visited.

XII.—*The Horse-Shoeing Competition at Swansea.*
By THOS. AUBREY, Judge.

THE terms of the Horse-Shoeing Competition on which I had to adjudicate at the recent Exhibition at Swansea were:—

1. That each competitor must make and fix a fore-shoe in the Showyard, having previously taken off the old shoe.
2. A competitor must bring his own tools and a striker.
3. All shoes must be fullered.

Forty-eight men entered their names as competitors, and of this number forty-two put in an appearance and took part in the contest.

One word at the outset as to the men themselves: whatever I may have to report as to their work, it is due to them to say

that their conduct during the progress of the competition was marked by the most cordial goodwill towards each other, and an earnest desire to distinguish themselves as citizens as well as craftsmen.

The horses selected for the purpose of the competition were all of the light class, and, thanks to the care and forethought of Colonel Best, Steward of the Department, their feet were fairly uniform in condition, and the task the men had to perform was thereby made as equal as possible.

No instructions were given to the men as to their mode of procedure, but all were left to exercise their own judgment, so that their work might be fairly considered on its merits.

The time taken to perform the prescribed work varied in different hands. Four accomplished the task under 30 minutes, and eight occupied between 50 and 60 minutes. The longest time occupied was 57 minutes, and the shortest, 23. The average period was about 41 minutes. The time taken by the three successful candidates was 44, 33, and 27 minutes respectively—giving 34 minutes as a possible average period for the accomplishment of the task with the highest standard of workmanship. Speaking generally, the work was fairly good, and showed a marked improvement upon that on which I adjudicated in 1867 and again in 1868, when the Show was held at Salisbury. The old and pernicious system of tearing the shoe from the foot without thoroughly knocking up the "clenches" was not followed in a single instance, but, in the majority of cases, regard for the integrity of the foot was shown by the frequent removal of the nails individually. This, I think, marks a distinct advance in the art of shoeing, and is a matter for the highest congratulation.

In *preparing the foot* for the shoe, however, there was a striking lack of anything like uniformity of procedure. In some instances horn was removed from where it was most needed, while in others it was left when it might with advantage have been removed. This discrepancy was clearly the result of a want of information regarding the anatomy of the foot and its physiological relations to the limb. The Somerset County Council have arranged for a series of elementary lectures to be given on this subject, and others would do well to follow their example.

Evidently all remembered the oft-repeated remonstrance against the excessive use of the drawing-knife, for in no case could the foot be said to have been unduly pared.

In shoe-making there were several excellent craftsmen, and the way in which they forged their iron and finished their work must have been an interesting and instructive object-lesson to

hose who looked on. The first and second prize-men were specially smart, and the shoes they produced were models of neatness.

As might be expected in so large a competition, indifferent workmen were not wanting. The fullering in some cases was badly executed, being coarse where it should have been fine, and *vice versa*. Moreover, it was often irregular in depth, which led to the heads of the nails not being properly buried. It was also noticeable in some cases that the nail holes were badly pitched and the shoes coarse and wanting in finish. Here there was a manifest want of care as well as skill, and a disposition on the part of the men to treat the shoe as a thing altogether unconcerned with the foot. In not a few instances the work was marred by too great haste. There were many examples of excellent "fitting" with the least possible employment of heat, but it must at the same time be pointed out that the hurtful system of burning the hoof in adjusting the shoe to the foot still survives. Not only was the heat employed sometimes excessive, but the period during which it was applied was altogether unnecessary to mark the bearing or relation of the shoe to the foot. In the hands of the more expert and intelligent workman, it was sufficient to bring the heated shoe lightly into contact with the crust, doing no more than scorching the horn, but, with the others, the hoof was charred and had consequently to be removed in large amount, while much that remained behind suffered from the effects of unnecessary heating. For the most part, the nailing was well done, and it is gratifying to be able to report that the abuse of the rasp, from which so much mischief has been done in the past, was less conspicuous than at any other occasion of the kind at which I have officiated.

In concluding this report, I would suggest that in future the competition be divided into two classes, one for heavy horses, and the other for light ones. This has already been done by some Societies with considerable advantage. There are many shoeing smiths whose business is almost entirely confined to cart-horses, who would acquit themselves with credit in their particular branch of the trade, but who fail to compete successfully in the shoeing of light horses with others who are constantly engaged thereat.

I cannot close this report without thanking Colonel Best for his kindness and attention in providing for the requirements of the competition, in the course of which, I am pleased to say, everything went delightfully smooth. My thanks are also due to Professor Axe, who kindly gave me his valuable assistance.

XIII.—*Field Experiments in* 1892. By CYPRIAN R. KNOLLYS, Steward of Experiments.

THE Field Experiments of 1892 were threefold, having for their object:—

(1) To ascertain the effect on the succeeding corn crop of the manures used upon the mangold plots of 1891.

(2) To ascertain what artificial manures can be used with advantage upon old pasture.

(3) To ascertain the effect of salt as an addition to nitrate of soda for top-dressing wheat and barley.

EXPERIMENT No. 1.

Turning first of all to Experiment No. 1, which is a repetition of that carried out in 1891, we find that the results then obtained are practically confirmed. The experiment was conducted in the same way; the corn upon the seven plots comprising the "dunged" series being harvested together, and the corn upon the seven plots comprising the "artificial" series being similarly treated. The results show that, whereas the "artificial" series of plots gave on the average an increased weight per acre of mangolds, amounting to 1 ton 10 cwt. over the "dunged" series, in the succeeding year the tables are turned, and the "dunged" series proves superior to the "artificial"—where wheat was grown, by 5 bushels per acre, where barley was grown, by $2\frac{1}{4}$ bushels per acre, where oats were grown, by $3\frac{1}{2}$ bushels per acre, and where dredge corn was grown, by $6\frac{1}{2}$ bushels per acre.

In four cases, however, all of them where land is well "done," the "artificial" plots turned out better than the "dunged." It would be interesting to observe how long this will continue; and, with reference to the rest of the experiments, valuable information could be obtained by noting the duration of the effect of the dung. In several cases the superiority of the "dunged" plots, both in corn and straw, was very marked.

EXPERIMENT No. 2.

The conditions to be observed in connection with Experiment No. 2 were printed in the last issue of the 'Journal,' but may with advantage be given again here.

The object of these Experiments is to ascertain what artificial manures can be used with advantage in improving the herbage of old pastures.

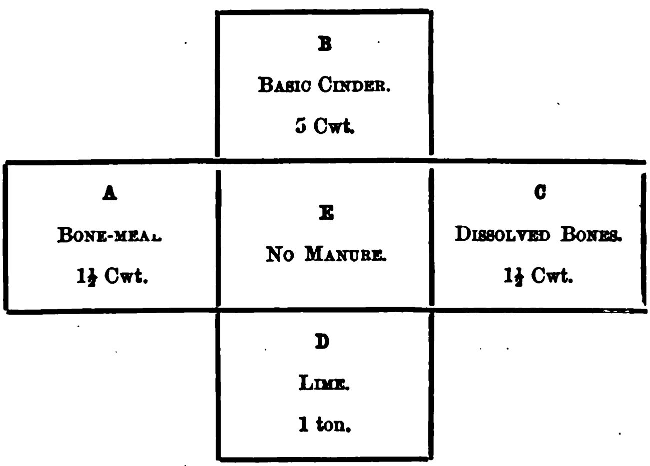
These Experiments being of a tentative character, with the view of ascertaining whether an improved and more complete scheme can be carried out in the future, it is proposed to limit them to four different manures, at a cost in each case of about 1l. per acre, and to plots of half an acre in size.

The Experiments are to be tried upon an old pasture which has not been dressed with dung for at least two years, and which will be grazed (not mown) for the next two years.

The manures and the quantities to be used, under the advice of the Society's Consulting Chemist, Dr. Voelcker, are bone-meal, 3 cwt. per acre; dissolved bones, 3 cwt. per acre; basic cinder, 10 cwt. per acre; and lime, 2 tons per acre.

The quantities to be applied to each half-acre plot are of course half the above, and are stated in the diagram.

The following diagram offers a suitable arrangement of the plots, and should, if convenient, be adopted:—



The lime should be that ordinarily used in the district for agricultural purposes, and is to be obtained by the Experimenter and charged to the Society. The artificial manures will be paid for by the Society and forwarded to the nearest railway station.

The bone-meal, basic cinder, and lime should be applied before the end of 1892. *The dissolved bones may be applied either at the same time or during the month of January,* 1893.

Wooden pegs should be driven in at the centre and corners of each plot.

To obtain a thoroughly satisfactory scheme of grass experiments is a matter of profound difficulty, but "nothing venture nothing have," so the Committee, after much anxious consideration, decided to start with this small scheme, which, if not of itself productive of great results, would, in all probability, teach us some lessons and help to clear away some of the difficulties which beset the whole subject.

At some stations no appreciable difference between the plots can at present be observed. But, on the whole, there is sufficient evidence to prove that the basic slag has so far been most successful, producing an herbage which stock have taken to very kindly and grazed much closer than the other plots. The lime plot stands next in favour, and whether this and the two bone plots will improve their position with time remains to be shown.

EXPERIMENT No. 3.

We come now to Experiment No. 3, which was suggested by Dr. Voelcker (who, it was hoped, would have been able to write a report upon it), with the object of obtaining a decided answer to the question whether, or not, the addition of salt to nitrate of soda, as a top-dressing for wheat or barley, is advantageous; a point on which at present there exists a diversity of opinion.

The following is a reprint of the conditions and instructions under which the experiment has been conducted:—

1. *The Experiments to be on land of even quality.*
2. *The Plots to be half an acre in size, and to be arranged and manured as in the accompanying Diagram.*
3. *The boundaries of each Plot to be clearly marked, so as to ensure a perfect division at harvest.*
4. *The manures to be applied as follows:—*

   The mineral superphosphate should be put on at the time, or shortly before, the barley is sown.

   Where nitrate of soda is used without salt (Plots B and E) it should be put on as a top-dressing, at

the discretion of the Experimenter, in two separate applications (half each time) with an interval of a few days between the applications.

Where nitrate of soda is used in combination with salt (Plots C and F) they should be mixed together and put on as a top-dressing, at the discretion of the Experimenter, in two separate applications (half each time) with an interval of a few days between the applications.

The four Plots should of course be dressed on the same day.

'iagram showing the arrangement of the Plots and the quantity of Manure per acre to be applied.

WHEAT.

A.	B.	C.	D.	E.	F.
No Manure.	*1¼ cwt. Nitrate of Soda.*	*1¼ cwt. Nitrate of Soda and 3 cwt. Salt.*	*No Manure.*	*1¼ cwt. Nitrate of Soda.*	*1¼ cwt. Nitrate of Soda and 3 cwt. Salt.*

BARLEY.

A.	B.	C.	D.	E.	F.
No Manure.	*3 cwt. Mineral Superphos. and 1¼ cwt. Nitrate of Soda.*	*3 cwt. Mineral Superphos. 1¼ cwt. Nitrate of Soda and 3 cwt. Salt.*	*No Manure.*	*3 cwt. Mineral Superphos. and 1¼ cwt. Nitrate of Soda.*	*3 cwt. Mineral Superphos. 1¼ cwt. Nitrate of Soda, and 3 cwt. Salt.*

NOTE.—*The above quantities are the rate* per acre. *As the Plots will be half acre in size, half the above quantities will, of course, only be required.*

5. *The dates of sowing and of the application of the top-dressings should be carefully recorded.*

6. *The corn grown on the Plots should be threshed as soon as possible after harvest, and the produce, natural weight per bushel, and weight of straw, entered on the Form B.*

There were twenty-five stations situated in nine different counties, and the following table gives the names of those gentlemen who have conducted the experiments, with the districts in which the plots are situated:—

LIST OF EXPERIMENTERS.

Cornwall.

Sir T. D. Acland, Mr. W. H. Tremaine } Trerice, near St. Columb.
Mr. T. Rich, Polsue, near Truro.

Devon.

Sir T. D. Acland, Mr. W. Stevens } Broadclyst, near Exeter.
Hon. Mark Rolle, Mr. R. Carter } St. Giles, near Torrington.

Somerset (West).

Mr. A. C. Skinner, Bishops Lydeard, Vale of Taunton.
Mr. John Kidner, Nynehead, near Wellington.
Mr. J. Dredge, Cutsey, near Wellington.
Sir T. D. Acland, Mr. C. Birmingham } Holnicote, near Minehead.

Somerset (East).

Mr. George Gibbons, Tunley, near Bath.

Gloucester.

Mr. T. D. Till, Thornbury (on the Hill).
Mr. J. B. Till, Thornbury.
Mr. W. M. Rugman, near Thornbury.

Hereford.

Mr. W. V. Bonner, near Ross.

Dorset.

Mr. T. T. Stacey, Winterbourne, Kingston, near Blandford.
Mr. W. Hooper, Winfrith, near Dorchester.

Wilts.

Sir Gabriel Goldney, Mr. H. B. Napier } Bradenstoke, near Wootton Bassett.
Mr. N. Story-Maskelyne, Bassett Down, near Swindon.
Messrs. C. & T. Coles, Winterbourne Stoke, Edge of Salisbury Plain.

Hants.

East
R. Hewett } Leckford, near Stockbridge.

Kent.

Brassey
G. P. Mitchell Innes } Preston Hall, near Aylesford.
F. D. Brockman
G. Lipscomb } near Shorncliffe.
Wm. Ashcroft, Hayes, near Beckenham.

tabulated results of each experiment will be found on 5–227, and interesting information can be obtained from study. But if, for the purpose of a general review, we these results, we find that the average produce of the ate plots stands thus:—

WHEAT.

Manures per Acre.	Head Corn.		Tail Corn.		Straw.		
	bus.	lb.	bus.	lb.	ton	cwt.	lb.
No Manure .. Ditto ..	33	21	2	10	1	4	63
1¼ cwt. Nitrate of Soda .. Ditto ..	37	14	2	40	1	7	46
1¼ cwt. Nitrate of Soda .. 3 cwt. Salt .. Ditto ..	37	23	2	37	1	7	47

BARLEY.

Manures per Acre.	Head Corn.		Tail Corn.		Straw.		
No Manure .. Ditto ..	39	31	2	43	1	1	118
3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. Ditto ..	45	40	4	3	1	7	26
3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. 3 cwt. Salt .. Ditto ..	47	29	3	25	1	8	52

will be observed that, where barley was grown, mineral hosphate has been used. In this, we are acting upon the of our barley experiments in 1889,* which clearly

* See 'Journal,' 3rd series, vol. xxi. p. 230.

indicated that its use, in connection with nitrate of so desirable.

Disappointment may possibly be felt that the di between the plots with salt and those without is no clearly marked, particularly with regard to the wheat.] difference in quantity is perhaps a secondary consid compared with the difference in quality, both in corn an (which this table does not show). As a general rule, t plots produced a better sample of corn, with decidedly and stronger straw. In some instances, the crop on th without salt (though not heavier) was much laid, whi on the salt plots stood up well.

Mr. Ashcroft, a careful observer, and one of our most experimenters, says:—" The corn on the unmanured plot " the most uneven of the three samples, and the salt " have an advantage over the unsalted in colour, evennes " size of grain by, I should say, quite 2*s.* per quarter. " salt makes the grain and straw perceptibly whiter. " convinced, from four years' experience, that it is the " thing to add; and I owe my information to the Batl " West and Southern Counties Society."

When, in addition, we bear in mind the comparatively cost of the salt, there appears to be ample justification, events in the case of barley, for an affirmative reply question whether or not the addition of salt to nitrate is advantageous.

To those gentlemen who have so kindly and so ca conducted these experiments the Committee beg to tende hearty thanks, and to express the hope that they may ha benefit of their assistance in future work.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	21 11	2 34	1 1 30	59	22 40	2 3	1 1 85
D	Ditto	24 10	1 31	1 2 28	59			
B	1¼ cwt. Nitrate of Soda	23 1	2 2	1 4 18	59	24 28	2 1	1 4 85
E	Ditto	25 55	2 0	1 5 40	59			
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	25 41	1 35	1 1 84	59	27 23	1 32	1 3 11
F	Ditto	29 5	1 29	1 4 50	59			

Previous Cultivation.—1889, Roots (2 cwt. Dissolved Bones; 3 cwt. Superphosphate). 1890, Barley. 1891, Seeds (dunged) cut for hay.
Soil.—Loam, on New Red Sandstone.

WHEAT. No. 2.—Sir T. D. ACLAND (Mr. Birmingham), SOMERSET, near Minehead.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Head Corn.	Average Tail Corn.	Average Straw.
A	No Manure	..	..	..	..	36 40	1 40	1 10 56
D	Ditto	..	..	..	..			
B	1¼ cwt. Nitrate of Soda	..	..	..	..	40 40	1 32	1 7 0
E	Ditto	..	..	..	..			
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	..	..	..	..	30 24	1 24	1 0 96
F	Ditto	..	..	..	..			

Previous Cultivation.—1889, Mangold. 1890, Wheat (no manure). 1891, Mangold (B. & W. E. Experiments).
Soil.—Stone Rush, on Gravel, near the sea.

WHEAT. No. 3.—Mr. J. B. TILL, GLOUCESTERSHIRE, near Thornbury.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	44 60	4 62	1 9 64	63	44 30	5 26	1 9 8
D	Ditto	44 0	5 53	1 8 64	63			
B	1¼ cwt. Nitrate of Soda	48 60	5 14	1 11 8	62	48 58	5 47	1 13 64
E	Ditto	48 56	6 18	1 16 8	62			
C	{1¼ cwt. Nitrate of Soda .. .. {3 cwt. Salt .. .. }	51 14	6 16	1 12 96	62	47 60	6 13	1 14 82
F	Ditto	44 44	6 10	1 16 68	62			

Previous Cultivation.—1889, Wheat (Sulphate of Ammonia). 1890, Barley (1¼ cwt. Nitrate of Soda). 1891, Clover (dunged), mown twice.

Soil.—Sandy Loam, on Gravel.

WHEAT. No. 4.—Mr. W. M. RUGMAN, GLOUCESTERSHIRE, near Thornbury.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Head Corn.	Average Tail Corn.	Average Straw.
A	No Manure	23 25	1 11	0 15 0	61	21 58	1 8	0 14 14
D	Ditto	21 32	1 6	0 13 28	60			
B	1¼ cwt. Nitrate of Soda	23 56	3 2	0 18 84	60¼	22 1	3 11	0 17 98
E	Ditto	20 6	3 20	0 17 0	60			
C	{1¼ cwt. Nitrate of Soda .. .. {3 cwt. Salt .. .. }	21 16	2 44	1 0 0	60	21 4	2 42	0 19 4
F	Ditto	20 52	2 40	0 18 8	60			

Previous Cultivation.—1889, Roots (12 loads of dung and 10 cwt. Artificial Manure), half the crop fed off by sheep with corn. 1890, Wheat. 1891, Clover, mown twice.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot.			Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots.		
		Head Corn.	Tail Corn.	Straw.		Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	46 20	1 26	1 8 76	62	47 10	1 47	1 7 92
D	Ditto	48 0	2 6	1 6 108	62			
B	1¼ cwt. Nitrate of Soda	52 0	2 24	1 12 14	61	54 0	2 19	1 14 4
E	Ditto	56 0	2 14	1 15 106	61			
C	{1¼ cwt. Nitrate of Soda .. .. {3 cwt. Salt	52 56	2 44	1 9 86	62	54 48	2 22	1 12 80
F	Ditto	56 40	2 0	1 15 74	64			

Previous Cultivation.—1889, Oats. 1890, Seeds, cut for hay. 1891, Second year's Ley, fed off with sheep.
Soil.—Strong Loam, on Chalk.

WHEAT.

No. 6.—Mr. W. HOOPER, DORSET, near Dorchester.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Head Corn.	Tail Corn.	Straw.
A	No Manure	28 8	3 3	0 19 58	61	26 14	2 37	0 18 99
D	Ditto	24 20	2 12	0 18 28	59½			
B	1¼ cwt. Nitrate of Soda	36 0	4 58	1 5 56	61	32 26	3 49	1 3 78
E	Ditto	28 52	2 40	1 1 100	60			
C	{1¼ cwt. Nitrate of Soda .. .. .. {3 cwt. Salt	30 8	2 52	1 1 36	62	29 4	2 54	0 19 80
F	Ditto	28 0	2 56	0 18 12	60			

Previous Cultivation.—1889, Barley (seeded). 1890, Clover, mown once, and afterwards fed off with sheep. 1891, Second year's Ley fed off with sheep and dunged for Wheat.
Soil.—Loam, on Chalk.

WHEAT. No. 7.—SIR GABRIEL GOLDNEY, WILTS, NEAR WOOTTON BASSETT.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.		Tail Corn.		Straw.			Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.		Tail Corn.		Straw.		
		bus.	lb.	bus.	lb.	ton	cwt.	lb.	lb.	bus.	lb.	bus.	lb.	ton	cwt.	lb.
A	No Manure	28	32	1	43	1	2	2	61	30	36	1	35	1	6	3
D	Ditto	32	40	1	27	1	10	4	61½							
B	1¼ cwt. Nitrate of Soda	35	33	1	41	1	8	4	61	35	19	1	32	1	10	4
E	Ditto	35	6	1	24	1	12	4	62							
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	39	18	1	48	1	10	4	62	39	20	1	55	1	12	5
F	Ditto	39	22	2	0	1	14	6	62							

Previous Cultivation.—1889, Seeds. 1890, Second year's Ley. 1891, Rape and Cabbage, fed off by sheep.
Soil.—Coral Rag.

WHEAT. No. 8.—MR. N. STORY-MASKELYNE, WILTS, NEAR SWINDON.

Plot.	Manures per Acre.	Head Corn bus.	Head Corn lb.	Tail Corn bus.	Tail Corn lb.	Straw ton	Straw cwt.	Straw lb.	Actual Weight of bus. lb.	Av. Head Corn bus.	Av. Head Corn lb.	Av. Tail Corn bus.	Av. Tail Corn lb.	Av. Straw ton	Av. Straw cwt.	Av. Straw lb.
A	No Manure	30	52	1	33	0	18	38	63	31	33	2	15	0	19	47
D	Ditto	32	14	2	60	1	0	56	62½							
B	1¼ cwt. Nitrate of Soda	37	44	1	52	1	2	50	61½	38	47	2	38	1	2	35
E	Ditto	39	50	3	24	1	2	20	62							
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	41	54	3	0	1	6	34	60	42	43	3	5	1	7	3
F	Ditto	43	32	3	10	1	7	84	61½							

WHEAT. No. 9.—MESSRS. C. AND T. COLES, WILTS, EDGE OF SALISBURY PLAIN.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	20 22	0 22	1 3 10	61½	21 57	0 17	1 3 67
D	Ditto	23 30	0 12	1 4 12	61½			
B	1¼ cwt. Nitrate of Soda	24 34	0 16	1 4 32	61½	26 17	0 17	1 7 5
E	Ditto	28 0	0 18	1 9 90	61½			
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	27 32	0 12	1 10 46	62	27 41	0 15	1 10 51
F	Ditto	27 50	0 18	1 10 56	63½			

Previous Cultivation.—1889, Barley. 1890, Seeds, cut for hay. 1891, Second year's Ley fed off by sheep with cake, followed by turnips, fed off with cake.

Soil.—Gravel, on Chalk.

WHEAT. No. 10.—MR. JOSHUA EAST (MR. HEWETT), HANTS, NEAR STOCKBRIDGE.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Head Corn.	Average Tail Corn.	Average Straw.
A	No Manure	18 40	2 42	0 15 32	63	17 20	2 21	0 14 8
D	Ditto	16 0	2 0	0 12 96	63½			
B	1¼ cwt. Nitrate of Soda	19 50	4 8	0 17 102	61¾	19 10	3 39	0 16 104
E	Ditto	18 32	3 8	0 15 106	61½			
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. .. : .. ..}	23 34	3 21	0 19 62	62½	22 47	3 52	0 18 100
F	Ditto	22 0	4 22	0 18 26	60½			

Previous Cultivation.—1889, Trifolium. 1890, Barley. 1891, Trifolium, fed off, land then fallowed and dunged for Wheat.

Soil.—Light Chalk, on Chalk.

WHEAT.

No. 11.—Mr. BRASSEY, KENT, near Aylesford.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.		Tail Corn.		Straw.			Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.		Tail Corn.		Straw.		
		bus.	lb.	bus.	lb.	ton	cwt.	lb.	lb.	bus.	lb.	bus.	lb.	ton	cwt.	lb.
A	No Manure	44	28	2	46	1	10	56	61¼	42	24	2	36	1	6	84
D	Ditto	40	20	2	26	I	3	0	62							
B	1¼ cwt. Nitrate of Soda	42	50	2	28	1	7	0	61¼	43	25	2	40	1	6	28
E	Ditto	44	0	2	52	1	5	56	61¼							
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	49	3	2	62	1	10	56	62½	48	42	2	31	1	8	84
F	Ditto	48	20	2	0	1	7	0	62½							

Previous Cultivation.—1889, Oats. 1890, Seeds, cut for hay once, then fed off by sheep. 1891, Second year's Ley, cut once for hay, then fed.

Soil.—Sandy Loam, on Gravel.

WHEAT.

No. 12.—Mr. F. D. BROCKMAN, KENT, near Shorncliffe.

A	No Manure	58	38	2	12	2	3	98	62	57	15	2	17	2	2	87
D	Ditto	55	54	2	22	2	1	76	62							
B	1¼ cwt. Nitrate of Soda	64	8	2	30	2	7	12	62	60	48	2	37	2	5	53
E	Ditto	57	26	2	44	2	3	94	62							
C	{1¼ cwt. Nitrate of Soda .. .. / 3 cwt. Salt .. ..}	63	8	2	22	2	2	76	62	56	45	2	42	2	1	81
F	Ditto	50	20	3	1	2	0	86	62							

		Head Corn.		Tail Corn.		Straw.			of bus.	Head Corn.		Tail Corn.		Straw.		
		bus.	lb.	bus.	lb.	ton	cwt.	lb.	lb.	bus.	lb.	bus.	lb.	ton	cwt.	lb.
A	No Manure	42	36	1	14	0	17	44	54	43	13	1	15	0	17	82
D	Ditto	43	44	1	16	0	18	8	53½							
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	54	36	1	46	1	0	80	54	53	19	1	50	1	1	75
E	Ditto	52	2	2	0	1	2	70	55							
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	52	8	1	43	1	3	72	55	52	35	1	54	1	2	78
F	Ditto	53	8	2	10	1	1	84	55½							

Previous Cultivation.—1889, Mangold (6 cwt. Dissolved Bones and 4 cwt. Mineral Superphosphate). 1890, Wheat (dunged and top-dressed with Nitrate of Soda). 1891, Turnips (4 cwt. Dissolved Bones; 2 cwt. Superphosphate), drawn off.

Soil.—Light and dry, Stone Rush.

BARLEY. No. 2.—Mr. T. RICH, CORNWALL, near Truro.

		Head Corn.		Tail Corn.		Straw.			of bus.	Head Corn.		Tail Corn.		Straw.		
A	No Manure	33	17	5	11	1	0	56	49	34	20	4	29	1	0	28
D	Ditto	35	23	3	47	1	0	0	49							
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	34	44	4	46	1	3	0	49	33	36	4	38	1	2	28
E	Ditto	32	28	4	30	1	1	56	49							
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	38	10	4	0	1	5	56	49	35	44	4	43	1	5	0
F	Ditto	33	29	5	37	1	4	56	49							

Previous Cultivation.—1888, Second year's Ley (dunged). 1889, Third year's Ley. 1890, Fourth year's Ley. 1891, Wheat.

Soil.—Stiff Loam, on Clay Slate.

BARLEY.

No. 3.—Sir T. D. ACLAND (Mr. Stevens), DEVONSHIRE, near Exeter.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	45 4	2 12	0 17 106	55½	45 8	2 12	0 18 16
D	Ditto	45 12	2 12	0 18 38	55½			
B	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. ..}	52 18	3 11	1 2 56	55	52 46	3 12	1 2 26
E	Ditto	53 20	3 13	1 1 108	55			
C	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt .. ..}	59 27	2 34	1 7 10	55	59 36	2 37	1 6 18
F	Ditto	59 45	2 40	1 5 26	55			

Previous Cultivation.—1889, Seeds (dunged), cut for hay. 1890, Ley. 1891, Wheat (¾ cwt. Nitrate of Soda).
Soil.—Sandy Loam, on Sand.

BARLEY.

No. 4.—Hon. MARK ROLLE (Mr. Carter), DEVONSHIRE, near Torrington.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
A	No Manure	23 36	0 20	0 10 56	54¾	23 29	0 19	0 10 21
D	Ditto	23 22	0 18	0 9 98	54¾			
B	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. ..}	35 42	0 24	0 17 98	55¼	36 42	0 23	0 18 56
E	Ditto	37 42	0 22	0 19 14	55½			
C	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt .. ..}	36 36	0 22	0 18 14	55½	36 12	0 21	0 19 49
F	Ditto	35 43	0 20	1 0 84	55¾			

Previous Cultivation.—1889, Oats. 1890, Swedes (4 cwt. Mineral Superphosphate; 1 cwt. Nitrate of Soda, as a top-dressing), drawn off. 1891, Oats (top-dressed with Nitrate of Soda).

		Head Corn.	Tail Corn.	Straw.	of bus.	Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	42 8	1 32	0 19 6	56	47 10	1 26	1 1 83
D	Ditto	52 12	1 20	1 4 48	56			
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	57 18	2 48	1 6 40	56	58 37	2 16	1 6 46
E	Ditto	60 0	1 40	1 6 40	56			
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	52 0	2 10	1 6 76	56	54 40	1 44	1 6 22
F	Ditto	57 24	1 22	1 5 80	56			

Previous Cultivation.—1888, Trifolium, fed off by sheep and followed by Roots (7 cwt. Dissolved Bones), fed off. 1889, Barley. 1890, Seeds, mown for hay, afterwards dunged for Wheat. 1891, Wheat.

Soil.—Light and dry, on Old Red Sandstone.

BARLEY.

No. 6.—Mr. JOHN KIDNER, SOMERSET, near Wellington.

A	No Manure	..	..	..	56½	51 49	0 50	Straw not weighed.
D	Ditto	..	..	..	..			
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	..	..	..	56½	54 43	2 6	
E	Ditto	..	..	..	..			
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	..	..	..	56½	58 40	2 6	
F	Ditto	..	..	..	..			

Previous Cultivation.—1888, Trifolium, folded with sheep and dunged (moderate dressing) for Swedes (4 cwt. Dissolved Bones), fed off by sheep with Cake. 1889, Barley. 1890, Seeds. 1891, Wheat.

Soil.—Sandy Loam, on Sand.

BARLEY.

No. 7.—Mr. J. DREDGE, SOMERSET, near Wellington.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	44 32	1 41	1 7 0	56¾	46 28	1 50	1 7 56
D	Ditto	48 24	2 3	1 8 0	56½			
B	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. ..}	50 12	3 0	1 11 56	56¼	52 6	2 52	1 15 84
E	Ditto	54 0	2 48	2 0 0	56			
C	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt .. ..}	52 26	2 35	17 0	56½	52 19	2 31	1 18 56
F	Ditto	52 12	2 27	2 0 0	56¼			

Previous Cultivation.—1889, Clover, mown once, then fed. 1890, Second year's Ley (dunged), mown once, then folded with sheep, 1891, Wheat.

Soil.—Loam, on Clay.

BARLEY.

No. 8.—Mr. G. GIBBONS, SOMERSET, near Clutton.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
A	No Manure	22 14	1 31	1 6 0	54½	25 27	2 10	1 8 0
D	Ditto	28 40	2 44	1 10 0	56			
B	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. ..}	31 8	2 32	1 17 0	56	26 6	5 49	2 1 56
E	Ditto	21 4	9 12	2 6 0	54			
C	{3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt .. ..}	33 29	2 28	1 12 0	54¾	30 52	2 18	1 12 0
F	Ditto	28 20	2 8	1 12 0	54			

Previous Cultivation.—1890, Roots, fed off with cake. 1891, Wheat.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	41 12	7 46	2 0 0	51¾	39 32	8 29	2 0 0
D	Ditto	38 0	9 13	2 0 0	53¼			
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	41 23	12 0	2 4 0	51¼	41 14	12 14	2 3 0
E	Ditto	41 6	12 28	2 2 0	52½			
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	43 42	9 46	3 2 0	54	43 32	10 1	2 13 56
F	Ditto	43 22	10 8	2 5 0	50			

Previous Cultivation.—1890, Wheat (1 cwt. Sulphate of Ammonia, 2 cwt. Superphosphate). 1891, Oats.
Soil.—Clay, on Lias.

BARLEY.

No. 10.—Mr. T. D. TILL, GLOUCESTERSHIRE, near Thornbury.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Head Corn.	Average Tail Corn.	Average Straw.
A	No Manure	30 8	5 47	0 16 12	53	30 0	5 36	0 16 26
D	Ditto	29 46	5 26	0 16 40	54			
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	37 42	5 4	0 18 40	55½	39 8	6 3	0 19 40
E	Ditto	40 30	7 2	1 0 40	57½			
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	40 30	6 4	1 0 30	57	39 35	6 12	0 19 20
F	Ditto	38 40	6 20	0 18 10	56			

Previous Cultivation.—1890, Clover. 1891, Wheat.
Soil.—Light and dry, Old Red Sandstone.

BARLEY. No. 11.—Mr. W. V. BONNOR, HEREFORDSHIRE, near Ross.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.	Tail Corn.	Straw.
		bus. lb.	bus. lb.	ton cwt. lb.	lb.	bus. lb.	bus. lb.	ton cwt. lb.
A	No Manure	37 30	1 36	1 5 22	58	36 14	1 20	1 2 102
D	Ditto	34 56	1 5	1 0 70	57			
B	3 cwt. Mineral Superphosphate .. } 1½ cwt. Nitrate of Soda .. .. }	41 21	1 35	1 6 18	57	41 43	1 29	1 4 94
E	Ditto	42 8	1 23	1 3 58	57			
C	3 cwt. Mineral Superphosphate .. } 1½ cwt. Nitrate of Soda .. .. } 3 cwt. Salt .. .. }	45 43	1 45	1 4 94	55	44 22	1 45	1 4 57
F	Ditto	43 1	1 45	1 4 20	55			

Previous Cultivation.—1889, Wheat. 1890, Barley. 1891, Turnips and Rape.
Soil.—Light and dry, Old Red Sandstone.

BARLEY. No. 12.—Mr. F. D. BROCKMAN, KENT, near Shorncliffe.

Plot.	Manures per Acre.	Head Corn.	Tail Corn.	Straw.	Actual Weight of bus.	Average Head Corn.	Average Tail Corn.	Average Straw.
A	No Manure	52 14	5 4	1 4 32	54½	51 0	4 35	1 2 92
D	Ditto	49 40	4 12	1 1 40	54½			
B	3 cwt. Mineral Superphosphate .. } 1½ cwt. Nitrate of Soda .. .. }	53 36	9 36	1 8 38	54	53 24	8 28	1 7 62
E	Ditto	53 12	7 20	1 6 86	54			
[illegible]	3 cwt. Mineral Superphosphate .. } [illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

BARLEY. No. 13.—Mr. W. ASHCROFT, KENT, near Beckenham.

Plot.	Manures per Acre.	Produce per Acre of each separate Plot. Head Corn.		Tail Corn.		Straw.			Actual Weight of bus.	Average Produce per Acre of the Duplicate Plots. Head Corn.		Tail Corn.		Straw.		
		bus.	lb.	bus.	lb.	ton	cwt.	lb.	lb.	bus.	lb.	bus.	lb.	ton	cwt.	lb.
A	No Manure	36	14	1	0	0	16	90	55½	40	2	1	3	0	18	26
D	Ditto	43	46	1	6	0	19	74	56							
B	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda	47	34	1	5	1	2	38	55¾	50	32	1	5	1	3	88
E	Ditto	53	30	1	6	1	5	26	56½							
C	3 cwt. Mineral Superphosphate .. 1¼ cwt. Nitrate of Soda .. .. 3 cwt. Salt	55	50	0	51	1	7	18	56½	53	34	0	44	1	6	38
F	Ditto	51	20	0	38	1	5	58	56½							

Previous Cultivation.—1889, Vetches, fed off, followed by late Turnips (2½ cwt. Basic Slag, 1 cwt. Superphosphate, ½ cwt. Nitrate Soda), fed off. 1890, Oats. 1891, Seeds, cut twice, folded with ewes subsequently.

Soil.—Clay Loam, with flint on Chalk.

XIV.—*Some Notes on the Storage of Nitrogen through the M of Leguminous Crops.* By Dr. J. A. VOELCKER, F.C.S Mr. C. T. D. ACLAND.

THE Experimental Committee of the Bath and West S having contemplated undertaking some experiments il tive of the effect of leguminous crops in collecting or a nitrogen in the soil in a form available for the use c ceeding crops, Dr. Voelcker, at the request of the Com undertook to consult Sir John Lawes on the subject. E entered into correspondence with Sir Thomas Acland, Ch of the Experimental Committee. With the permission Voelcker, the gist of the correspondence is subjoined, as lil be interesting to many readers and as bearing upon a qu of considerable practical importance.

The following words occurred in a statement of the ob the proposed experiment:—"Recent investigations have the conclusion that certain leguminous crops have the po abstracting nitrogen from atmospheric sources as well a the soil." With reference to this, Sir T. D. Acland add Dr. Voelcker as follows:—"I thought the course of rec vestigation was just the reverse. Surely for twenty y more the idea that leguminous plants inhaled nitrogen fr air through *their leaves* was thought to be true. I thougl Warington, Hellriegel, and others whom I cannot recall, ha a few years ago introduced the doctrine of Bacilli underg I was also under the impression that recent German exper had shown that the leaves do not absorb nitrogen."

Sir Thomas also asked: "Is it at all likely that, when sickness is so frequent, more frequent leguminous crops v manure can be of any use?"

Dr. Voelcker, in reply, said:—"What you say is, in the perfectly correct, and so is the statement to which yo All that is needed is to show that the two are reconcilabl

"That plants took up nitrogen from the air *by their lea* controverted by the experiments of Lawes, Gilbert, and but there still remained, in the case of leguminous c supply of nitrogen which could not be accounted for fr soil or from manure alone, and hence it was still believ leguminous crops must somehow take up nitrogen from tl

"Recent investigations have shown that leguminous do abstract nitrogen from the air, but NOT by means c LEAVES, as was believed at first, but by the intervention of nodules which are of fungoid nature and form upon the r the leguminous crops. These nodules appear to have the

cing the nitrogen *supplied in the air*, which enters the soil, of elaborating it into nitrogenous plant food.

Accordingly, this is something quite different from the other ›very you speak of, viz. the formation of nitrogenous plant from the nitrogen contained in the SOIL itself (not from the contained in the soil) by means of a nitrifying ferment or llus. What this ferment does is to take the nitrogen rring in the form of humic matters (unassimilable as such lants) and convert them into nitrates—in which latter form nitrogen *can* be assimilated. The words therefore that were in the scheme, 'abstracting nitrogen from atmospheric ces,' did not mean *by their leaves*, nor yet did they refer to nitrifying ferment that acts on the *soil* nitrogen, or on the ›gen supplied in manures like farmyard dung, &c., but to action of the nodules referred to, and which are (as yet) noticeable in the case of *some* of the Leguminosæ. The fying ferment (bacillus) is always at work whatever the be (cereal, legume, or root), but the nodules, so far as we w, only with the Leguminosæ.

With regard to the alternative system. There is not the you apprehend, viz. of clover-sickness. Lawes and Gilbert clearly shown that land that is 'clover-sick' for one kind lover may yet produce another kind of leguminous crop *ectly well.* It may not be able to grow *red* clover, perhaps, change the crop, taking, say, lucerne or melilotus, or beans, , &c., and they will thrive. Thus the land is only sick for rticular crop, and not for all Leguminous crops."

may be well to add that, valuable as experiments upon this ect are likely to be, the various difficulties in forming a factory scheme to meet all the points that have to be idered, have induced the Experimental Committee to draw their proposal for this year. It may, however, be h while, if possible, to induce some individual members of Society to commence, on their own account, a course of riments upon the subject. It is, of course, evident that less than four or five years would be necessary to bring out result worth recording.

The Note-Book.

1.—*Influence of Cold upon the Consumption of Food by Stock.* By L. Grandeau.*

THE unusually sharp winter of 1891 was not only injurious to crops in the ground, but, like all severe cold, it also affected cattle.

In the opinion of some farmers, the simplest way of counteracting the fall of temperature in stables and sheds seems to be to close, as thoroughly as possible, the premises occupied by the cattle. Simple as this may be, it is not a good practice; and the closing of stables and sheds may be the cause of losses even more serious than those which they dread from the effect of cold. It is not enough, as some think, to place on the floor of the shed some substance capable of absorbing the gases emanating from the animal excrements, in order to purify the air sufficiently for the cattle to continue in comfort. Ventilation, that is to say the slow and continuous renewal of the air, is the only thing which will maintain that purity of atmosphere indispensable for the regular working of the organism, and we must have recourse to other means in order to ward off the danger of cold.

Men and animals have an indispensable need of pure air—air that has not been inhaled and exhaled too frequently by them without a considerable access of outside air. Every one knows the uneasiness, amounting sometimes to faintness, which one feels in a place where many individuals have been assembled for some hours. One often hears, in a drawing-room, or in a theatre, &c., this uneasiness attributed to an insufficient quantity of oxygen or an excess of carbonic acid. In many cases, as experiments have proved, this is an error. In fact, the atmosphere in a room which is almost unbearable will frequently not reveal in its composition a diminution of oxygen or increase of carbonic acid gas sufficient to account for the physiological phenomena experienced by those who inhale it.

Atmospheric air contains about 2 or 3 parts of carbonic acid in 10,000 parts. Air vitiated by men begins to get un-

* From 'Études Agronomiques,' par L. Grandeau. Sixième serie (1890-1891). Paris, Libraire Hachette et C^ie.

bearable long before containing 5 parts in 1000 of its volume of carbonic acid from the human breath; for in the unpleasant atmosphere of barracks, theatres, and other places of meeting, one seldom finds 2 parts per 1000 of that gas. Can we attribute to that minute quantity of carbonic acid the extreme physical uneasiness resulting from a sojourn in the above mentioned places? By no means.

Direct experiments have shown that man can breathe with perfect ease in a room with an atmosphere containing 1 part in 100 of carbonic acid, provided the latter is introduced in a pure condition by a chemical process other than the organic change which gives it birth in the animal's body. Assuming the absolutely certain fact that air several times inhaled by a sound man is vitiated, for reasons imperfectly known but certainly other than the diminution of oxygen or increase of carbonic acid, we have ascertained by experiments that in order that inhabited premises may be well ventilated, 60 "metres cubes" (about 600 cubic feet) of pure air per head must be introduced in a period of twenty-hours.

The preceding applies to animals as well as men, due regard being given to proportions of weight. A bullock, for instance, like a man, gives off into the air, through the breathing organs and cutaneous perspiration, besides water vapour and carbonic acid, ill-defined organic products, which exercise on his physiological action a disorder like that which a man feels if the air in his room is not sufficiently renewed. To ensure a proper renewal of air in a shed, you require in twenty-four hours about 80 "metres cubes" (800 cubic feet) of fresh air per head for big cattle.

It is therefore evident that the closing up of outlets in stables or sheds would most seriously affect the health of animals, even supposing that you could absorb the ammonia formed from the decomposition of the excrements.

Although it is not the carbonic acid in the exhaled gases which causes the uneasiness experienced, one must not conclude therefore that a considerable quantity of this gas would not have serious evil effects in closed sheds. The contrary can easily be proved. Let us suppose a cowshed 33 feet long, 16 feet wide, and 10 feet high, having a capacity of about 5000 cubic feet. Place therein 10 bullocks and close doors and windows perfectly tight. In twenty-four hours time the air in that shed would contain 33 per cent. carbonic acid, and the oxygen would have completely disappeared. In other words, long before the twenty-four hours had elapsed, all the animals would have died. This supposition, which is of course absurd, shows the necessity of ventilation, and the impossibility, beyond a certain limit, of

keeping animals free from the effects of a fall in the outward temperature, by too closely shutting up the sheds. We have, however, fortunately, excellent means of guarding against a fall of temperature in our cattle sheds through ventilation, even in severe weather. We find this regulator in the food and its variations. The maximum possible digressions of temperature in our climate, in properly constructed sheds, will hardly exceed 45° Fahr. (from 32° to 77°). By housing a number of animals in proportion to the capacity of the premises, you can always keep the temperature at least at 40° Fahr.

Let us examine how the food of bullocks, for instance, must be regulated, in order that the organic equilibrium may be maintained, that is to say, that the weight of the animal may not be sensibly modified, or, in the case of a milch-cow, in order that the weight of the secreted milk may not diminish, in spite of these variations of temperature.

An animal maintains its own temperature (98° to 100° Fahr.) in spite of the greatest digressions of the temperature of the surrounding atmosphere; the slow combustions which are proceeding in the organs produce the heat required for the maintenance of an unvaried temperature in the body. Since there is a continuous production of heat, there is naturally a continuous loss of heat. This loss is divided unequally among three great classes of phenomena: eight-twelfths are lost by radiation into the air; three-twelfths are used up in the evaporation of water through the pulmonary and cutaneous organs, *i.e.* in the breath and in perspiration; the last twelfth raises to the temperature of the body, the oxygen, the food, and the drink consumed. One can understand then that, in order to preserve this equilibrium, a more intense organic combustion is required in winter than in summer; in other words, a greater amount of nourishment, and particularly of food rich in carbon.

The temperature most conducive to the good health of man and domestic animals is between 50° Fahr. and 65° Fahr. Below and above these limits, the organism has to make particular efforts to preserve its proper temperature. We have a proof of this in the difference of food in different climates. The Northern tribes, the Esquimaux, and the Laplanders feed on food rich in combustible elements, such as fat, oil, &c.; the inhabitants of the Tropics, on the contrary, live on fruit, vegetables and more or less aqueous food.

In general, animals bear cold better than intense heat, provided their feeding ration is increased.

To what extent is it to be increased? Direct experiments by Henneberg and Stohmann have considerably advanced the solution of this question.

Sheep.—The sheep is the farm animal which best bears cold. The most suitable temperature for a sheepfold is 50° Fahr.; it may fall to 44°, and even 42°; it must not rise beyond 54°—56°. A temperature of 78° is far more pleasing to the shepherd than to the sheep: it is expensive and bad for them.

In order to maintain the functions and the live weight of the sheep, the quantity of nutritive elements contained in its daily ration must vary, according to temperature, in the following proportions. Column A indicates the weight of nutritious matter required in order to cover the loss by radiation; Column B the quantity of the same elements to be added to compensate for the loss through evaporation; Column C the total weight of food to be given in the several temperatures considered:—

		A.		B.		C.
	Degrees F.	Gr.		Gr.		Gr.
Temperature	32	400	+	0	=	400
"	41	340	+	20	=	360
"	50	310	+	40	=	350
"	59	295	+	60	=	355
"	68	285	+	80	=	365

The smallest and, consequently, most economical ration corresponds to 50° temperature. The above table enables us then to modify *pro tem.* the alimentary diet of a flock, according to the temperature of the spot where the fold is situate. The variation in these rations, and the expense which it naturally involves, is considerable, and rises to 50 "grammes" on 400 "grammes," that is, one-eighth of the weight of the daily ration.

Oxen.—Oxen, like sheep, bear cold better than heat, but the average temperature which suits them best is 53° Fahr. to 60° Fahr. To this temperature corresponds the minimum consumption of food and water in consequence of a minimum perspiration.

Henneberg has ascertained by experiments the variations in the weight of respiratory food—*i.e.* food required to maintain the temperature—consumed by these animals in the shed at temperatures varying from 41° to 68°, and with a living weight of 500 "kilos." (about 1100 lbs.) he has found the following:—

	Feb.	March.	May.	July.
Temperature	41°	50°	59°	68°
Quantity of respiratory food consumed (in kilos.*) ..	5·50	4·32	3·72	4·25

* A kilogramme, 1000 grammes (usually termed a "kilo") equals 2·2 lbs.

The quantity of so-called respiratory food is expressed in the weight of starch necessary.

The results of the experiments quoted in the above tables show that when the temperature of the stable is about 59° Fahr., it is then that the oxen, in order to cover the loss of heat and maintain condition, consume a minimum quantity of food. This temperature, therefore, should be given to stables, if it can be, without arresting the ventilation indispensable to animal health. If this result cannot be obtained in consequence of the intensity of the outside cold, every breeder, with an eye to his own interest, will have to modify his cattle's food allowance: he will increase, in the proportion of 3·7 to 5·5, say by about half, the quantity of starchy elements (Carbohydrates) contained in the food above that which he would consider sufficient for the maintenance of the oxen and cows in the month of May. Otherwise, the animal, being bound to maintain its proper temperature, in spite of the great fall of the air temperature, will lose in his substance the quantity of material required to produce this heat, which is to him indispensable. As to milch cows, to maintain their temperature, they will use up the food which usually goes to form their milk. Should the stable contain fattening oxen, the evil effects resulting from the temperature of a severe winter, if not compensated by an increase of food, will be more and more visible, and there will be a risk of great loss of time and money before the damage done to the animal can be repaired. Hence stables, both in winter and in summer, must be properly ventilated for the animals to be healthy and to prosper, and the variations in temperature must be compensated by rational modifications in the feeding.

2.—*Manurial Experiments on Poor Pasture Land.*

By DOUGLAS A. GILCHRIST, B.Sc.

THESE experiments, which have emanated from the Agricultural Department of the University College of North Wales at Bangor, were commenced in 1890, the land was in exceedingly poor condition, and had been under pasture for about fifteen years. The soil is a stiff sour clay, and the subsoil is hard and retentive. Prior to 1890 the herbage on the field was coarse and scanty, and the field had not been manured for a considerable time.

In these experiments all the principal manures which are applied to pasture-land have been compared with each other, viz. :—Lime, farmyard manure, phosphatic manures (bone-meal,

›lved bones, superphosphate, and basic slag), a nitrogenous ure (nitrate of soda), and a potash manure (kainit). The ation in the quality of the hay is not shown in the tabulated lts, but this point will be considered in dealing with the lts on the different plots. The size of the original plots half an acre, and in 1891 these were divided into two plots. following Table gives a condensed statement of the results ined on some of the plots:—

TABLE A.—WEIGHT OF HAY PER ACRE.

›er Acre applied 1890.	1890.	1891.		1892.		
	PLOTS A.	PLOTS A. No additional Manure.	PLOTS B. The Manure of 1890 repeated.	PLOTS A. No Manure since 1890.	PLOTS B. No additional Manure since 1891.	PLOTS C. The Manure of 1890 and '91 repeated.
cwt. lbs.	tons cwt. lbs.	tons cwt. lbs.	tons cwt. lbs.	tons cwt. lbs.	tons cwt. lbs.	tons cwt. lbs.
ag (best y) .. 2 0 osphate 1 28 of Soda 1 0 .. .. 1 0	1 17 92	1 5 80	1 16 54	0 18 40	0 19 32	1 9 0
ag (best y) .. 3 0 of Soda 1 0 .. .. 1 0	1 15 8	1 7 76	2 2 68	1 1 72	1 3 0	1 8 0
osphate 3 84 of Soda 1 0 .. .. 1 0	1 17 76	1 5 44	2 3 28	0 18 40	1 0 16	1 8 32
d Bones 4 0	1 8 48	1 9 64	1 18 100	1 2 40	1 8 0	1 12 32
ag (best y) .. 1 94 osphate 3 8 of Soda 0 92	1 13 46	1 7 52	2 1 80	1 1 28	1 4 64	1 13 16
tons) ..	1 1 24	1 3 16	..	0 18 64	..	..
ure	0 19 54	1 1 24	..	1 0 100	..	..
eal .. 4 0	1 1 28	1 10 44	1 11 4	1 4 100	1 5 60	..
osphate 3 84	1 4 96	1 10 60	1 16 28	0 18 72	1 0 80	1 2 96
ag (best y) .. 3 0	1 8 36	1 7 72	1 11 20	0 17 52	1 1 96	1 4 80

RESULTS ON THE LIMED PLOTS.

plots 6 and 7 are compared it will be found that when lime been applied there is a slight increase of crop for the first years, but there is actually a smaller return in the third . These results indicate that on land in poor condition alone had practically no effect. When, however, farmyard ure and other manures were applied in conjunction with , good results were obtained. On these plots, also, the ity of the herbage was improved, whereas lime itself did produce any improvement.

Results with Farmyard Manure.

In 1891 the farmyard manure plots did not compare favourably with the other manures, but this result was partly due to the fact that the manure was not applied until the spring. But the results were much better with that manure the subsequent season. Plot 13 had farmyard manure in 1891, and nitrate of soda and basic slag in 1892. Last season this plot gave the best result, and it is evident that if these manures were applied alternately every two years to this land good crops of hay would be produced annually. In some districts where Timothy hay is grown extensively, this plan of manuring is practised, and gives excellent results.

Results with Nitrate of Soda.

Nitrate of soda was only applied in combination with other manures, except to plot 15 in 1892. Wherever it has been applied the grasses have been increased, and the clovers have been diminished; while the hay has reached maturity earlier in the season. A greater bulk of hay has been produced, as a result of the increased development of the stems of the grasses. This manure, however, has deteriorated the pasture for grazing purposes, as the bottom herbage is not so close nor of such fine quality. For this reason it is not advisable to apply nitrate of soda to grazing land, and when applied to a hay crop the quantity should not exceed 1 cwt. per acre.

Results with Phosphatic Manures.

The superphosphate and the basic slag applied in 1890 did not give a material increase over the unmanured plots in the third season after their application (1892); but the plots to which bone meal and dissolved bones were applied, continued to give increased returns. We therefore conclude that dissolved bones, and especially bone meal, are more permanent in their action than superphosphate or basic slag. The quality of the herbage is, nevertheless, much better where the latter manures were applied than on the unmanured plots; the bottom herbage of the pasture is much thicker and clover and allied plants are more abundant. Where superphosphate or basic slag has been applied for two years or for three years in succession the result is good. These manures applied by themselves have improved the field for purposes of pasturage more than for purposes of haymaking.

Results with Basic Slag as compared with Superphosphate.

On the whole basic slag gives a better return than superphosphate, while the cost of the basic slag is much less. A like amount of phosphoric acid was contained in the basic slag applied to plot 2, and in the superphosphate applied to plot 3. Apparently no advantage results from applying a mixture of basic slag and superphosphate as has been done on plot 1. This plot did best in 1890, but did not maintain its position in 1891 and 1892. Plots 9 and 11, on which these manures are applied by themselves, show results during 1890 and 1891, slightly in favour of superphosphate, but in 1892 the results on these plots are in favour of basic slag. The latter manure only cost 6*s.* per acre, while the former cost 12*s.*

Results with Dissolved Bones, and with its equivalent in other Manures.

Plots 4 and 5 show the results from an application of dissolved bones, as compared with an application of superphosphate, basic slag, and nitrate of soda, containing the same manurial ingredients as the dissolved bones. If we compare the results over the three years we find that the mixture is the most economical. The quality of the herbage, however, is best where the dissolved bones have been applied, and this manure is more permanent in its action.

Results with a Potash Manure.

Two plots were started in 1891 to show how far kainit—a potash manure—was useful for this land. Clay soils are generally rich in potash, so that we would not expect such good results with this manure here, as on lighter land. The kainit has not only increased the bulk, but has also improved the quality of the herbage. The pasture on these plots had a darker green colour, and clover plants have been encouraged.

Some Economical Results of the Experiments.

The hay was mown on July 25th. Good weather continued from that date till the 29th, when the hay on each plot was weighed and was afterwards carried to the stack. The hay was weighed as follows:—A cart was partly loaded with hay from a portion of the field not under experiment. Across the top of this load a pole was laid, one end being tied down, and the

other projected over the side, from which a balance was suspended. Each heap of hay was placed in a large net and weighed on this balance, the cart being drawn from one plot to another until the hay on all the plots had been weighed.

Table B shows the net profit per acre over the three years accruing from the application of some of the manures. Only the bulk of the hay produced is taken into account, and not the variation in the quality of the hay. This table, therefore, indicates the economical results as to weight of herbage only. The extra hay produced is valued at 2*l.* per ton, which is approximately the consuming value of the hay produced on this farm.

TABLE B.

No. of Plot.	Manure applied.		Cost of Manure over 3 Years.			Amount of Hay produced in 3 years over the average of the Unmanured Plots.			Value of increased Amount of Hay.			Net profit per Acre over the 3 Years.			
			£	*s.*	*d.*	tons	cwt.	lbs.	£	*s.*	*d.*	£	*s.*	*d.*	
6	Lime	For 1 year.	2	10	0	0	4	15	0	8	3	2	1	9	Loss.
8	Bone Meal	For 1 year.	1	8	0	0	17	83	1	15	3	0	7	3	Gain.
4	Dissolved Bones ..	For 1 year.	1	7	6	1	1	71	2	3	6	0	16	0	"
9	Superphosphate ..	For 1 year.	0	11	11	0	15	9	1	10	2	0	18	3	"
11	Basic Slag (best)..	For 1 year.	0	6	0	0	14	71	1	9	6	1	3	6	"
5	Equivalent to Dissolved Bones ..	For 1 year.	1	2	8	1	3	37	2	6	9	1	4	1	"
2	Basic Slag, Nitrate and Kainit ..	For 1 year.	0	18	3	1	5	67	2	11	0	1	12	9	"
9	Superphosphate ..	For 3 years.	1	15	8	1	5	9	2	10	2	0	14	6	"
11	Basic Slag (best)..	For 3 years.	0	18	0	1	5	47	2	10	10	1	12	10	"
2	Basic Slag, Nitrate and Kainit ..	For 3 years.	2	16	0	2	6	99	4	13	9	1	17	0	"

One of the objects in carrying out this experiment was to find whether this poor weedy pasture-land could be practically freed from weeds by manuring only. We cannot, however, say that this has been done. The weeds have been considerably reduced on some of the plots, but even on the plots on which they are most reduced they are still a considerable source of trouble. Probably the weeds would have been further reduced if the field had been grazed and not mown. When the plots have been manured judiciously an abundance of good pasture plants have appeared, though these better plants have not yet succeeded in evicting the troublesome weeds which are the tenants in possession.

General Conclusions.

The following conclusions may be drawn from the results of the three years' experiments on this land:—

Phosphatic manures, containing phosphoric acid in a condition easily assimilable, are the most valuable manures for improving such pasture-land. These manures encourage a fine bottom growth of grass and clover herbage.

Superphosphate and basic slag are the most economical phosphatic manures for this land; and while both these manures give good results, on the whole the economic advantages are largely in favour of basic slag of the best quality. This, however, cannot be said of the basic slag of inferior quality. The results show that superphosphate and basic slag are practically exhausted in the third year after their application; but, although the weight of the herbage is not increased after that time, the quality is very much improved, as well as the pasture for grazing purposes.

Bone meal and dissolved bones are more permanent in their effects than superphosphate or basic slag, but they act much more slowly, especially the bone meal. The herbage is very much improved for grazing purposes where these manures have been applied.

Nitrate of soda largely increases the total bulk of hay produced, it encourages the strong-growing grasses, and brings the herbage earlier to maturity. The results show that this manure is valuable for producing heavy crops of hay, but that it is not suited for pasture-land, as it destroys the fine bottom herbage by encouraging the coarse strong-growing grasses, and by discouraging clovers and allied plants.

Kainit, as a potash manure, has given slightly increased results; but the value of the increased produce is less than the value of the kainit applied.

Lime applied to this exhausted land, even in the third season after application, has had almost no effect in improving the quality or bulk of the herbage.

In many cases the manures have encouraged the better hay and pasture plants, and have discouraged the weeds, but, even on the plots that show most improvement, weeds are not exterminated, especially the yellow rattle, which has proved to be troublesome. If the field had been kept under pasture instead of being mown, the weeds would probably have been further reduced.

3.—*A Comparison of the Separator, Jersey Creamer, and Cornish System of Cream-Raising, and their Influence on the Yield of Butter.*

THE Technical Education Committee of the Cornish County Council, before starting Dairy Instruction, "found strongly expressed and conflicting opinions as to the respective merits" of the above systems of cream-raising for the purpose of butter-making. They therefore instituted a series of experiments to test the merits of these systems; each being managed by one who was considered an expert in its use. The following were the objects in view:—

> "The quantity of butter which the above systems respectively would produce from equal quantities of milk."
>
> "The quality of the butter and its value in the large markets of the kingdom."
>
> "The relative labour and expense in working the three systems."

They have published the results of these experiments in a pamphlet from which we take the following. Two sets of experiments were conducted. The quantity of milk dealt with each day was 20 gallons by the Separator, and by the Jersey Creamer, and 10 gallons by the Cornish system. On the first occasion the following results were obtained:—

		lbs.	oz.	lbs.	oz.
1. Butter from Separator.	1st day	9	15¾		
" "	2nd "	9	15		
				19	14¾
2. Butter from Jersey Creamer.	1st day	8	4½		
" "	2nd "	8	4		
				16	8½
3. Butter from Scald Cream (Cornish system).	1st day	4	1½		
" " "	2nd "	3	15¾		
From half quantity Milk		8	1¼	16	2½

The butters obtained in the above tests were now submitted to analysis, and to judges of butter, to test their quality on arrival, and to retain them for ten days and again test the quality and report results.

No. 1, Butter from Separator, was reported on as fine and the best.

No. 2, Butter from Jersey Creamer, was of fair quality only, and after keeping ten days "strong."

No. 3, Butter on Cornish system, was not of good quality but did not deteriorate by keeping.

The analyses of these butters were as follows:—

	No. 1.	No. 2.	No. 3.
Water	10·8	13·30	15·6
Fat	88·8	86·00	80·8
Curd	·3	·70	1·3
Salt..	·14	·06	2·3
	100·04	100·06	100·0

The results obtained were so startling that the Committee decided to repeat the experiment.

The results of the second experiment were as follows:—

		lbs.	oz.	lbs.	oz.
1. Butter from Separator.	1st day	8	2		
„ „	2nd „	7	15		
				16	1
2. Butter from Jersey Creamer.	1st day	6	0		
„ „	2nd „	6	4		
				12	4
3. Butter from Cornish System.	1st day	3	2½		
„ „	2nd „	3	11		
From half quantity Milk		6	13½	13	11

These samples were also submitted to analysis and sent to be judged by experts.

The results of the analyses were as follows:—

	No. 1.	No. 2.	No. 3.
Water	13·00	12·50	11·80
Fat	86·50	86·70	87·30
Curd	·32	·34	·37
Salt	·23	·50	·51
	100·05	100·04	99·98

None of these butters appear to have been of good quality.

It will be seen that in both the tests the amount of butter made from the cream obtained by the Separator was much larger than the quantity of butter made by the other methods, and this difference is not due to the composition of the butter, *i.e.*, to an excess of water or curd, but to the fact that the Separator takes out of the milk far more of the butter fat than can be secured either by the Jersey Creamer or by the Cornish method of scalding the cream.

The high keeping quality of the butter made from the scald

cream in the first experiment, even though this butter contained four times as much curd and more water than the sample of butter made from the separated cream, is interesting. We do not think it can be explained by the larger quantity of salt present, but that the heat employed destroys the organisms which effect the destruction of butter, thus confirming the argument which we have tried to impress upon the readers of this Journal that the keeping quality of butter is dependent not on the decomposition of the casein but on the action of the organisms which that casein may contain, or upon those introduced by washing the butter with impure water.

No attempt appears to have been made to calculate the relative labour and expense of working the three systems.

4.—*The Ripening of Cream.* By P. DE VUYST, Agronome de l'État. (Abstract of Translation.)

ACCORDING to different experts, the taste and aroma of butter ought not to be attributed solely to the kind of food given to the cow; they do not pre-exist, so to speak, in the milk, but are greatly due to the phenomenon of fermentation which takes place in the cream during the ripening that ought to precede churning.

In the ripening of cream, the sugar of milk is converted into lactic acid and sometimes carbonic acid, and the casein and other substances are altered to a certain degree. This gives an agreeable taste to the butter. Probably certain alcohols are simultaneously produced by the fermentation, while excessive ripening produces rancidity.

These different changes are due to microscopical organisms (microbes), and daily experience shows the importance of their action. A larger yield, and a more aromatic produce is obtained when the cream employed possesses a certain degree of "acidity," as it is commonly called.

This souring can be carried too far. On the other hand, when the cream is not kept within the limits of temperature, the best suited for developing favourable microbes, or when it is kept in unclean places, the fermentation may become injurious. Thus, in cream kept in too low a temperature, the lactic fermentation takes place too slowly, and is superseded by a putrid fermentation which produces a bitter (biting) taste. Hence most competent experts maintain that the ripening of cream ought to take place rapidly, say in twenty-four hours. To secure this, cream should be kept at a temperature of about 65° F.

The importance of controlling the ripening of cream is such that several *savants*, notably Dr. Storch, of Copenhagen, and Dr. Weigmann, of Kiel, have sought to regulate it artificially by introducing the proper microbes, these having been isolated from the many varieties present in cream undergoing spontaneous fermentation.

In October last a bottle of such ferments was kindly sent to the dairy of Borsbeke by Dr. Weigmann, from the Kiel laboratory, with the proper instructions for its use. These instructions were carefully followed, and several comparative experiments made with the ferments. The object of these experiments was not to prove the scientific value of Weigmann's process, nor to determine the question of artificial fermentation, but simply to discover with what ease the system might be carried out, and its advantages from an industrial point of view.

Cream from the separator, after being cooled, was treated as follows:—

(*a*) was inoculated with Dr. Weigmann's ferments.
(*b*) „ „ with ferments prepared from these according to his instructions.
(*c*) was not inoculated, but allowed to ripen naturally, in order to serve as a comparison.

These three creams were kept under the same conditions for twenty-four hours. They had then reached a nearly uniform degree of acidity. Churning was started at 56° F., and the conditions were, as nearly as possible, the same in all three cases.

The comparative trials (*b*) and (*c*) were next repeated with larger quantities of cream, in order to ascertain the difference of yield, taste, keeping quality of the butter, &c. The butter obtained in the first trial (*a*) was in too fine grains, and there was a certain amount of loss from this source.

The butter from the cream inoculated with the renewed ferments (*b*) was obtained under more satisfactory conditions. That which was obtained from the cream spontaneously soured (*c*) was of better appearance.

In three subsequent experiments the butter was obtained in a more regular condition.

The following results were obtained:—

FIRST EXPERIMENT.

		Weight of Butter.
(*a*).	Cream inoculated with ferment sent	1·170
(*b*).	„ „ „ „ obtained	1·260
(*c*).	„ acidified spontaneously	1·320

SECOND EXPERIMENT.

		Weight of
(*b*).	Cream inoculated with ferment obtained	1·25
(*c*).	„ acidified spontaneously	1·31

THIRD EXPERIMENT.

(*b*).	Cream inoculated with ferment renewed	1·38
(*c*).	„ acidified spontaneously	1·39

FOURTH EXPERIMENT.

(*b*).	Cream inoculated with ferment renewed	1·20
(*c*).	„ acidified spontaneously	1·23

The difference in the yield of butter is small; the a tion of artificial ripening does not seem favourable fro point of view. The richness of the butter in fatty n which was determined, was also in favour of natural acidifi

As to the taste of the butter, (*a*) appeared at first mo cate, but after two or three days a slight rancidity was r The butter made from cream inoculated with the renew ment (*b*) seemed very fine and kept well, as did also the obtained from cream naturally acidified.

The ferments cultivated at the dairy of Borsbeke were other dairies. The trials made in these have proved th artificial method of ripening helps to improve the qua the butter, but there is no perceptible difference in the y

Below are the results of Wevelghem :—

FIRST TRIAL.

		Weight of
(*a*).	Cream inoculated with ferments	1·9
(*b*).	„ acidified naturally	1·9

SECOND TRIAL.

(*a*).	Cream inoculated	2·0
(*b*).	„ acidified naturally	2·0

THIRD TRIAL.

(*a*).	Cream inoculated	2·3
(*b*).	„ acidified naturally	2·2

We may conclude from these experiments that the ar method of ripening cream does not give results suffi striking to be preferred to well-conducted spontaneous ri When the butter obtained under ordinary circumstances i we can do without ferments, whose occasional use would an increase of unremunerative labour. Nevertheless, th method would be of real service in dairies where good cannot be obtained owing to unfavourable conditions, inf too great dampness, &c. One certainly might remove the

in the butter arising from these causes by inoculating the cream with the prepared ferment. This conclusion also confirms what M. Böggild recently wrote to us:—

"The acidification of the cream by artificial ferments is practised in several factories. The butter obtained thus is not better than that from good dairies. But the process is considered useful where natural ripening is difficult."

M. Van Velsem, Agricultural Engineer at Louvain, who studied dairying for six months in Denmark, states that the opinion of Dr. Storch himself would be still less enthusiastic.

There already exist several counterfeit cultures sold for ripening cream, and great caution is necessary before attempting to introduce their use. But we may hope that the day is not far distant, when, having found the microbes which give the best aroma to butter, we shall be able to obtain cultures in a pure state.

We have seen above that the most competent experts praise a rapid acidification at about 65° F. The operations of artificial fermentation require, according to several authorities, a higher temperature. Evidently a great deal of importance must be attached to temperature in carrying out the fermentation, or ripening of the cream. This temperature ought to be regular. The inequality of the product, irregularities in churning, &c., are largely due to irregularities in the fermentation of the cream, owing to variations in the temperature. The best dairy is subject to some variation, and during the winter is not generally at a temperature requisite for good fermentation. The Danes and Americans have tried to remedy this. The author has arrived at a perfect way of ripening cream by means of a simple application of an automatic temperature regulator, such as is used in an Incubator.

5.—*The Agricultural Returns of Great Britain,* 1892.
Abstract of Major Craigie's Report.

The Returns.

The Annual Statement for 1892 is based on a total of 521,662 Returns. Of these, England contributed 380,738, Wales 60,844, and Scotland 80,080. Information has also been obtained in respect of Live Stock from owners who either occupy no land or farm areas below the limit of agricultural holdings. The number of such stock owners recorded in 1892 was 16,221.

In rather more than 96 out of every 100 cases the information required by the schedules was furnished by the occupiers themselves. In less than four per cent. of the whole number of Returns, and for 4·85 per cent. of the cultivated surface it was necessary to resort to estimate.

The Returns show that 14 per cent. of the surface of the agricultural holdings forming the cultivated area of Great Britain in 1892 was in the occupation of its owners, and 86 per cent. was farmed by tenants.

LAND UNDER CULTIVATION.

Mountain and Heath Grazings.

An attempt has been made to exhibit a more or less approximate estimate of the area, lying outside the cultivated acreage, yet employed to assist, in some degree, in furnishing support to the live stock, and especially the sheep, which have been annually enumerated in these statistics. The existence of an extensive but only partially productive area of sheep runs and hill grazings, outside and beyond the permanent grass annually recorded, is now made apparent; and, so far as Scotland is concerned, much more than the whole cultivated area accounted for was employed in providing a subsidiary maintenance to the flocks of sheep farmers.

It would appear that the rough hill grazings and unenclosed mountain lands over which sheep and other live stock range, and whereon they obtain a more or less scanty subsistence, cover approximately a territory of over 12,000,000 acres, or more than one-fifth of the surface of Great Britain. More than three-fourths of this estimated acreage of rough pasture have been recorded in Scotland alone. The English hill grazings not before accounted for, are naturally far below the figures for Scotland, the estimate only reaching 1,862,000 acres. The Welsh hill grazings not previously enumerated would appear to cover approximately 953,000 acres.

Proportion of Live Stock to Surface.

In certain sections of the United Kingdom much difference is caused in the proportional statement of Live Stock carried on a given surface, according as the area treated of happens to be that regarded as "cultivated," or that which would be obtained were account taken also of the rough grazing areas above noted. While in England, and still more in Wales, considerable differences are shown in the Stock of Cattle carried on each 1000 acres of the cultivated area, or of the cultivated area and hill grazings combined, in Scotland the differences are still more striking. There, it appears, the horses used in agriculture, which appear as 41 per 1000 acres "cultivated," are only 14 per 1000 acres cultivated and grazed. The Cattle, instead of being 249 to each 1000 cultivated acres, would come out as 86 to the 1000 acres of the combined cultivated and grazed territory; while the Sheep, instead of being 1539 per 1000 acres of the cultivated acreage, are reduced to 532 per 1000 acres of the larger area which, as a matter of fact, carries them.

Acreage of Cultivated Land.

The Cultivated area, which includes the crops, bare fallow, and grass in Great Britain in 1892, represents 32,685,000 acres occupied in holdings exceeding an acre in extent. This surface is divided with almost exact precision, between arable land and permanent pasture, the former covering 16,327,000 acres and the latter 16,358,000 acres.

Reduction of Cultivated Area.

The arable land, as has been the case in every year but two since 1872, again shows a reduction. The surface appearing in this category is 157,000 acres less than in 1891. The permanent pasture in 1892 is also less than that returned in 1891 by 76,000 acres. This change in an opposite direction to those recorded for a considerable period, is wholly explained by a stricter definition of the term Permanent Grass now enforced in certain mountainous counties, where some of the additions made in 1891 to this category were found on closer inquiry not to have been fully justified, the areas in question being again relegated to the class to which they properly belonged, of uncultivated hill grass, the limits of which it has this year been possible more closely and consistently to define.

Twenty Years' Changes in Arable Land and Pasture.

The characteristic changes of the two great sections of the cultivated area, which have taken place between 1872 and 1892, may be shown for Great Britain as a whole as under :—

Years.	Arable.	Pasture.	Total Cultivated Area.
	Acres.	Acres.	Acres.
1872	18,428,000	12,576,000	31,004,000
1882	17,492,000	14,821,000	32,313,000
1892	16,327,000	16,358,000	32,685,000

The surface under the plough has undergone a steady diminution. This had begun in some of the earliest years of the series, there being a loss of 340,000 acres of arable land between 1872 and 1874. But the extension of the area under Permanent Grass since 1872, has been very much greater than could be accounted for by the laying down to pasture of the land passing out of arable culture.

Between 1872 and 1882 about 936,000 acres were withdrawn from arable tillage and reappeared in the form of permanent pasture. The surface returned as permanent pasture was also, in the same decade, augmented by a further 1,310,000 acres, due to reclamations and extensions, and to the increased accuracy and scope of the yearly returns.

In the later ten years a similar process has continued. Between 1882 and 1892 the arable area has diminished by 1,165,000 acres, while the pasture area is greater by 1,537,000 acres, that is not only by the acres thus transferred, but by a second addition amounting to 372,000 acres.

Proportional extent of different Crops.

We are left, therefore, with 2,101,000 less acres under arable culture, but with a grass area which is 3,782,000 larger than was recorded in 1872.

It would appear that since 1872 England has diminished her arable area by 1,952,000 acres, or over 14 per cent., Wales has reduced her arable surface by 227,000 acres, or 21 per cent., but Scotland returns more arable land than before

by some 78,000 acres. This may be partly explained by the marked characteristic of the agricultural system of North Britain, which appears in the relatively large area retained under clover and rotation grasses. Nearly 33 per cent. of the whole cultivated surface of Scotland remains in this category, in England the area so occupied is less than 11 per cent.

In Scotland the Permanent Pasture accounts for only about 27 per cent. of the cultivated surface. In England it covers 52 per cent., and in Wales 69 per cent.

Within the arable area, in England, where the main loss of acreage has occurred the Wheat crop still occupies 18 per cent. of the surface under the plough, while only 6 per cent. in Wales, and not 2 per cent. in Scotland is employed in the growth of Wheat. In Scotland and in Wales Oats are the chief cereal crop, claiming 28 and 27 per cent. respectively of the arable surface.

Wheat.

Comparing the changes in Great Britain between the last two seasons, it appears that less Wheat by 87,438 acres was recorded in 1892, than in the preceding year. This has brought the total down to 2,219,839 acres, a lower figure than was shown in 1886, hitherto the year when the smallest Wheat area was recorded in Great Britain. But for a very general increase in Scotland, amounting in the aggregate to 8298 acres, which has again placed the Scotch Wheat area nearly in the position it held in 1890, the decline would have been greater still, for England and Wales showed nearly 96,000 acres of Wheat less in the past year. In only four English and two Welsh counties was evidence given of an opposite current, and, with the exception of Norfolk and Suffolk, these exceptional Wheat increases were in no way important. In Norfolk the Wheat area was greater by 6973 acres, and in Suffolk by 4193 acres, than in 1891.

It appears that in Great Britain, 116 acres out of every 1000 acres of cultivated land grew Wheat in 1872, while only 68 acres out of a like acreage retained that cereal in 1892. In Scotland, in place of 30 acres, only 13 acres out of 1000 are now grown. In Wales only 19 acres are retained in place of 48, whereas in the great Wheat growing counties of Eastern England an average of 156 acres in every 1000 is still to be found, and there are instances, like that of Cambridge, where 224 acres, in every 1000 cultivated, continue to carry Wheat.

Barley.

The decline in the area under Barley, in 1892, is very nearly as great as that in Wheat, or 75,988 acres, and this decline appears in Scotland and Wales as well as England, the largest absolute decrease being in Norfolk, where 15,273 acres less are grown. There are a few exceptional movements in the opposite direction, but none of these are of much significance.

Oats.

The surface under Oats, which had kept nearly uniform for four years previously, has been in 1892 extended by 98,416 acres, nearly all the increase being in England, where every single county shows an augmented Oat area in the current year.

and Corn Counties of England.

following Table indicates the distinctive differences in the relative- ;ure of the 21 Grazing Counties of the West of England, and the tern or Corn Counties, where the arable area still retains its pre- ce.

GE under all CROPS in GRAZING COUNTIES and in CORN COUNTIES ENGLAND, and PERCENTAGES of each CROP in the GRAZING and N COUNTIES respectively, in the year 1892.

	In Grazing Counties.		In Corn Counties.	
	Acreage.	Percentage of Total for England.	Acreage.	Percentage of Total for England.
ᐯcreage returned under all ; of Crops, Fallow, and Grass	13,403,968	53·8	11,520,236	46·2
ᐯcreage of Per- ent Pasture .. For Hay ..	2,405,698	62·7	1,429,225	37·3
Not for Hay	6,101,841	66·3	3,100,207	33·7
ᐯcreage of Arable Land ..	4,896,429	41·2	6,990,804	58·8
e under—				
at	627,009	29·8	1,475,960	70·2
ey and Bere	556,674	32·6	1,152,913	67·4
.. ..	928,194	52·6	837,269	47·4
.. ..	16,360	42·2	22,398	57·8
s	63,647	21·6	231,033	78·4
.. ..	33,580	17·5	158,380	82·5
tal under above Corn Crops	2,225,464	36·5	3,877,953	63·5
toes	187,933	53·7	161,785	46·3
ips and Swedes	625,826	45·0	764,180	55·0
gold	101,897	29·0	250,133	71·0
age, Kohl-Rabi, and Rape	54,886	38·8	86,714	61·2
hes or Tares	61,147	33·2	123,139	66·8
r Green Crops	17,556	19·0	74,912	81·0
er and other ass under ro- ion .. .. .. For Hay ..	757,993	48·2	816,185	51·8
Not for Hay	703,920	61·4	442,266	38·6
tal under above Green Crops and Grass under rotation ..	2,511,158	48·0	2,719,314	52·0
.. ..	705	50·2	699	49·8
;	10,322	18·3	45,987	81·7
l Fruit	17,064	30·2	39,438	69·8
Fallow	131,716	30·0	307,463	70·0
ards and Market Gardens ..	169,980	60·7	109,997	39·3
ery Grounds	4,745	41·9	6,586	58·1
ds and Plantations	828,000	51·3	785,849	48·7

extent to which the two groups of Counties thus distinguished differ in a devoted to different kinds of crops, may be shown by the following

Summary, exhibiting the percentage of the Total Cultivated Acreage under each head in the year 1892.

Description of Crops.	In Grazing Counties.		In Corn Counties.		In all Counties.	
	Acreage.	Per cent.	Acreage.	Per cent.	Acreage.	Per cent.
Corn Crops	2,225,464	16·6	3,877,953	33·7	6,103,417	24·5
Green Crops	1,049,245	7·8	1,460,863	12·7	2,510,108	10·1
Clover and other Grass under Rotation ..	1,461,913	10·9	1,258,451	10·9	2,720,364	10·9
Flax	705	0·0	699	0·0	1,404	0·0
Hops	10,322	0·1	45,937	0·4	56,259	0·2
Small Fruit	17,064	0·1	39,438	0·3	56,502	0·2
Bare Fallow	131,716	1·0	307,463	2·7	439,179	1·8
Total of Arable Land ..	4,896,429	36·5	6,990,804	60·7	11,887,233	47·7
Total of Permanent Pasture	8,507,539	63·5	4,529,432	39·3	13,036,971	52·3
Total	13,403,968	100·0	11,520,236	100·0	24,924,204	100·0

The Grazing or Western Division includes the following counties, viz.:—Chester, Cornwall, Cumberland, Derby, Devon, Dorset, Durham, Gloucester, Hereford, Lancaster, Leicester, Monmouth, Northumberland, Salop, Somerset, Stafford, Westmoreland, Wilts, Worcester, York (North Riding), and York (West Riding).

The Corn or Eastern Division includes:—Bedford, Berks, Bucks, Cambridge, Essex, Hants, Hertford, Huntingdon, Kent, Lincoln, Middlesex, Norfolk, Northampton, Nottingham, Oxford, Rutland, Suffolk, Surrey, Sussex, Warwick, and York (East Riding).

Potatoes.

A net decrease of 7433 acres in the total area under Potatoes, brings down the surface so employed in Great Britain to 525,361 acres.

Turnips and Mangolds.

Both Turnips and Mangolds appear to have been more largely grown than in 1891. The net collective increase in the area of these two forms of green crops appears to be somewhat over 1 per cent. or 25,159 acres. The extension is in England and Wales only.

Vetches.

In the case of Vetches, now distinguished as a separate green crop, there is a general decline in England and Wales, and a total decrease in Great Britain of 29,580 acres, or nearly 13 per cent.

Clover and Rotation Grasses.

In Clover, Sainfoin, and Rotation grasses, entered as intended for Hay, there is a considerable variation in the changes shown. A net decrease of 18,050 acres in England, is overbalanced by an extension of 8446 acres in Wales, and of 14,842 acres in Scotland. In the still larger section of the same crops intended

to be grazed, both Scotland and England show a less surface, than in 1891, and Wales a slightly increased one; but the net reduction under this head is 49,000 acres, while the reduction of the whole Clover area is not, in the aggregate, a matter of 1 per cent. There are still 4,673,000 acres in Great Britain carrying Clover or temporary grasses, which is considerably more than the average surface thus utilised before 1886.

Grass kept for Hay.

In Permanent Pasture reserved for mowing, the total area is reduced by somewhat less than 1 per cent. In Wales and Scotland there is an increase, which in the latter country exceeds 6 per cent. The net effect of these changes leaves the area of Permanent Grass in Great Britain, intended in June last to be kept for Hay, only 13,482 acres below last year's figure of 4,503,108 acres.

Acreage under Hay.

It was pointed out in last year's Report on these Returns that taking temporary and permanent grass together, the area reserved for Hay, was, in 1891, 437,000 acres below that of 1890, and 831,000 acres less than that of 1889. The figures of the year 1892, leave the position very much as it was last year, the diminution of the entire Hay area being 8000 acres only. This, in view of the considerably increased numbers of Live Stock may, to some extent, explain the fall in the values of animals, which is attributed largely to relative deficiency of keep.

Small Fruit.

Full details are given regarding the area under Small Fruit which again shows an increase. The acreage returned for Great Britain was 62,148 acres, of which 56,502 were grown in England. Every English county returns a certain acreage under this head, but there are only five where as much as 2000 acres is returned. Kent heads the list with 19,821 acres; Middlesex returns 3718 acres, Worcester 2421, Lancashire 2192, and Cambridge 2064.

Orchards.

Orchards appear to cover an acreage fractionally less than in 1891, the total in Great Britain being 209,000 acres, but there are some considerable extensions in counties such as Kent and Middlesex.

Hops.

The Hop acreage of Great Britain is slightly greater than in 1891, but the present total, 56,259 acres, is still considerably below the average prior to 1889. More than half of the Hop crop is grown in the county of Kent. The Kentish Hop area of 34,000 acres is nearly 4000 acres short of the surface so cultivated 20 years ago.

Live Stock.

In the year 1892 there has been an increase, although a smaller one than in 1891, in the number of live stock returned.

Horses.

The Horses used in Agriculture are more numerous by 4035 than last year. The increase appears general throughout England and Scotland, and it would have been greater had not the Welsh returns exhibited an apparent drop of 2007 head.

The class of Unbroken Horses displays a notable increase of nearly 23,000 head on the 401,000 returned last year. Every county in England and all but six in Scotland and Wales contributed their quota to this increase.

There is also an increase, but not so large as that noticed last year, in Mares kept "solely for breeding," but when the figures are examined in conjunction with those last referred to, it becomes clear that breeding from mares not kept solely for that purpose, but probably returned in the class of working agricultural horses, must be largely resorted to.

Cows.

Cows and Heifers in milk or in calf are returned as slightly fewer in number than in 1891.

Other Cattle.

Under the head of two-year old cattle there is, in 1892, an addition of nearly 11 per cent., or 162,000 head. On the other hand, Cattle under two years old are less numerous than they were in 1891 by nearly 64,000. Only half this diminution is to be credited to England, where the falling off is little over one per cent., while in Wales it affects every county, and exceeds 5½ per cent. The Scotch changes are not uniform, and the total decline there does not quite reach 3 per cent.

Increase in number of Cattle.

There are nearly half-a-million more young cattle in Great Britain than at the beginning of the decade. The total stock of cattle of all ages now approximately reaches 7,000,000 head, a higher total than has ever before appeared in the Agricultural Returns. The figures are:—

Years.	Cows, &c.	2-Year old Cattle.	Young Stock.	Total.
	No.	No.	No.	No.
1872	2,165,000	1,422,000	2,038,000	5,625,000
1882	2,267,000	1,396,000	2,144,000	5,807,000
1892	2,651,000	1,667,000	2,627,000	6,945,000

Sheep and Lambs.

In the class of Sheep of one-year old and upward a one per cent. increase is the net result of local changes. The largest declines in Sheep in 1892

e reported from Cumberland and Lancaster; the largest increases from ent, Essex, and Devon. Lambs are fewer in 1892 than in 1891 by 168,000. lacing this loss against a net increase of 170,000 in older Sheep, the result aves the flocks of the country practically unchanged. There are, however, cal variations deserving attention. Thus, towards the total diminution in ambs, England contributes only 15,644 on a total of over 7,000,000 head, an significant percentage; in Wales, where the Lambs numbered 1,095,000 in 391, the falling off is 54,000, or 5 per cent.; and in Scotland there is a reduction 98,000 Lambs on 2,760,000, or 3½ per cent.

eduction in Pigs.

The most striking, if not the most important, of the changes indicated by the turns of 1892, is the large reduction in the total stock of Pigs. These are turned as numbering only 2,138,000 in Great Britain against 2,889,000 a year efore. A decline occurs also in Ireland, and in the Channel Islands, raising the tal loss in the United Kingdom to over a million head. The decline reaches early 26 per cent. over England, and in some counties, like the three Ridings of orkshire, only two-thirds of the Pig Stock enumerated in 1891 have been re- orded. In Wales the decrease is about 27 per cent.; in Scotland it approaches) per cent. The number of Pigs is always subject to frequent and sometimes iolent fluctuations. The numbers returned in 1891 and 1890 were unusually igh, exceeding by half a million head the average of such recent years as 1886–7. lutted markets and low values rapidly produced a reduction. The present gure, although 749,000 under that of 1891, is only 83,000 less than the number f Pigs in 1886, and it is actually 88,000 more than the average Stock of the iree years 1879-80-81, when the Pigs of Great Britain were fewer than now, and ut little exceeded 2,000,000. The low prices prevailing some time back led iany farmers to diminish or discontinue pig breeding as unprofitable, and the ibsequent rise in the value of these animals made it difficult to re-stock as ipidly as is sometimes done. As the prices of bacon and pork have been of te abnormally high in contrast with other forms of meat, it is likely that pig eeding will be again stimulated, as the question of price has obviously been ie governing factor in the general diminution.

ish Returns.

In the Irish Corn crops the increased acreage under Oats overbalances the ecline in Wheat and other grains, and Grass in all forms shows an increase, but i other respects the changes are in much the same direction as in Great Britain, smaller area under Flax is again reported. Under the head of Horses, Cattle. nd Sheep, the Irish increases are all greater in proportion than in Great Britain.

Summary for United Kingdom.

By incorporating the data supplied by the Irish Returns and those for the Isle Man and the Channel Islands with the statistics collected for Great Britain, is possible to obtain a general view of the agricultural position of the United

Kingdom. The more important alterations between 1891 and 1892, occurring in the entire United Kingdom, may be summarised in the accompanying Table:—

Acreage.	1892.	1891.	1892 compared with 1891. Increase.	1892 compared with 1891. Decrease.
	Acres.	Acres.	Acres.	Acres.
Total Cultivated Area	47,977,903	48,179,473	..	201,570
Total of Permanent Pasture ..	27,533,326	27,567,128	..	33,802
Total of Arable Land	20,444,577	20,612,345	..	167,768
Corn Crops	9,328,701	9,443,509	..	114,808
Green Crops	4,467,115	4,510,653	..	43,538
Clover, &c., under Rotation ..	5,973,456	6,015,037	..	41,581
Flax	72,065	76,477	..	4,412
Hops	56,259	56,145	114	..
Small Fruit	62,547	59,122	3,425	..
Bare Fallow	484,434	451,402	33,032	..
Live Stock.	No.	No.	No.	No.
Horses	2,067,549	2,026,170	41,379	..
Cattle	11,519,417	11,343,686	175,731	..
Sheep	33,642,808	33,533,988	108,820	..
Pigs	3,265,898	4,272,764	..	1,006,866

Twenty Years' Changes.

These figures only indicate the changes which a single twelvemonth has displayed. For the purpose of a longer retrospect the following short summary table gives one or two of the leading features which distinguish the agricultural position of the United Kingdom now and at intervals of 10 and 20 years back, with the parallel changes in population in this period.

——		1872.	1882.	1892.
Population	No.	31,556 000	35,208,000	38,109,000
Cultivated area ..	Acres	46,869 000	47,655,000	47,978,000
Corn crops	„	11 698,000	10,620,000	9,329,000
Wheat crops	„	3 840,000	3,164,000	2,299,000
Permanent grass ..	„	22 838,000	24,963,000	27,533,000
Cattle	No.	9 719,000	9,832,000	11,519,000
Sheep	„	32 247,000	27,448,000	33,643,000

Returns of Prices.

The average prices of Wheat, Barley, and Oats, in the year 1892, compared with 1891 have fallen per quarter, in the case of Wheat 6*s.* 9*d.*, in the case of Barley 2*s.*, and in the case of Oats 2*d.* A wider comparison with the prices of

each of the years, which have been selected for the foregoing comparisons in the distribution of Crops and Live Stock, shows:—

Year.	Wheat.	Barley.	Oats.
	Per Quarter. *s.* *d.*	Per Quarter. *s.* *d.*	Per Quarter. *s.* *d.*
1872	57 0	37 5	23 2
1882	45 1	31 2	21 10
1892	30 3	26 2	19 10

Prices of Meat.

The general range of the prices quoted at the Metropolitan Cattle Market in the above years shows that the estimated prices are all below 1882, but for Beef they show little variation from the prices of the past six years. Mutton prices are lower, and those of Pork are higher than in recent years.

Imports.

Imports of Meat.

The Imports and Exports of Agricultural Produce are given in detail up to the end of 1891. The total Imports exhibited an increase in 1891 over 1890—imports of food in the form of Live Animals alone showing a decrease. The Live Cattle imported in 1891 were 507,000 against 643,000 in the year 1890, while the Sheep received in 1891 were 344,000 compared with 358,000 in 1890. On the other hand, the supplies of Fresh Meat were again augmented, a total of 1,921,000 cwt. of Fresh Beef and 554,000 cwt. of Beef preserved otherwise than by salting, being received. The Fresh Mutton imports barely exceeded the large quota of 1891, reaching 1,663,000 cwts. in all. Adding to this total 65,000 cwt. of preserved Mutton it may be noted that this great importation represented in dead meat nearly ten sheep to every one of the sheep imported alive.

The changes in the Values of the imports of animals intended for food and of all forms of dead meat since 1871 may be thus summarised:—

Year.	Cattle and Beef.	Sheep and Fresh Mutton.	Pigs and Bacon, Hams, and Pork.	All other forms of Meat.	Total.
	£	£	£	£	£
1871	4,218,000	1,790,000	3,710,000	770,000	10,488,000
1881	8,915,000	2,192,000	11,493,000	2,154,000	24,754,000
1891	14,270,000	4,082,000	10,042,000	713,000	29,107,000

The development of this import trade in Beef has been remarkable, but the form in which it comes is changing, for whereas twenty years ago, 85 per cent. was brought to our shores in the shape of live cattle, in 1891 it was reduced to 60 per cent. In 1871 the whole recorded import of Mutton consisted of live Sheep. The trade in Frozen carcasses came into notice in 1882. And in 1891 only 16 per cent. of the supply of Foreign Mutton came here alive.

Imports of Dairy Produce.

In addition to Butter, Margarine, Cheese and Eggs, the imports of Condensed Milk are also shown. The aggregate value of this section of our agricultural imports is 24,368,000*l.* The stages by which this total has been reached may be shown as under:—

Years.	Butter and Margarine.	Cheese.	Condensed Milk.	Eggs.	Total.
	£	£	£	£	£
1871	6,939,000	3,341,000	..	1,264,000	11,544,000
1881	10,866,000	5,245,000	..	2,322,000	18,433,000
1891	15,149,000	4,813,000	9?0,000	3,506,000	24,368,000

In 1891 nearly one-fourth of the total value in the first column, or 3,558,000*l.*, is attributed to the Margarine imported—nine-tenths of the supply of Margarine coming from Holland. Denmark continued to be by far the largest single contributor to our imports of Butter in 1891, sending 876,000 cwt., valued at 4,866,000*l.* France and Sweden follow. More than three-fourths of the entire importation, or 1,646,000 cwts., came from these three countries. 54,000 cwts. of Butter were drawn from Australasian sources, 46,000 cwts. from Canada, and 64,000 cwts. from the United States.

Imports of Eggs.

The variety of sources whence the 1,275,398,000 eggs, valued at 3,506,000*l.*, have been drawn, offers matter for consideration. France and Germany still furnish more than half of the whole, and Belgium, Russia, and Denmark come next in order as egg exporters to this country. The Canadian quota has increased from 2,000,000 to 33,000,000 in a single year, and we have now laid under contribution a variety of minor sources, among others, the Canary Islands, Turkey and Egypt.

Imports of Grain.

The largest single group of Agricultural imports is Grain, Meal, and Flour. Measured in value, these imports do not, in the aggregate greatly exceed the total of the several forms of meat and other animal produce above enumerated. Neither do they in their annual value, show the same rapidity of development. This must, in part, be ascribed to the exceptional decline in the prices of grain. The three years' imports are thus valued:—

Years.	Wheat and Flour.	Maize.	All other Corn and Meal.	Total of Corn, Meal and Flour.
	£	£	£	£
1871	26,817,000	6,469,000	9,405,000	42,691,000
1881	40,737,000	10,408,000	9,711,000	60,856,000
1891	39,633,000	8,412,000	13,977,000	62,022,000

arison of quantities of produce Imported.

e relative dimensions roughly, in tons, of the more important items of the reat divisions of our Agricultural Imports will be as under:—

Imports.	1871.	1881.	1891.
	Tons.	Tons.	Tons.
Animals, representing ..	90,500	117,500	171,500
Meat	99,500	341,600	489,500
r, Margarine, and Cheese	127,500	194,500	270,500
it	1,969,500	2,857,500	3,315,500
r	199,000	568,000	836,000
e	841,000	1,674,000	1,341,000
r Corn and Meal	1,188,000	1,232,500	2,072,000

e value of the first three items in this table reaches 50,000,000*l.*, while that e four following commodities exceeds 62,000,000*l.* The contrast in bulk of Vegetable as compared with the Animal produce imported is strikingly n. While Meat Imports in the shape of Live Animals have nearly doubled iantity in 20 years, Dead Meat of all forms has increased almost five-fold. rts of Flour are more than four times as great as they were in 1871, the ase of wheat imported in grain being about 69 per cent. only. The ratio of imports to the total receipt of breadstuffs from abroad last year will be still remarkable.

Imports per head of Population.

e Imports per head of the estimated population of the United Kingdom in ear 1891 alone, with the mean supply of the immediately preceding five- periods is shown in the following Table:—

Periods.	Wheat in Grain.	Flour.	Potatoes.	Fresh Beef, Mutton and Pork.	Bacon and Hams.	Butter and Margarine and Cheese.	Eggs.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	No.
e of 5 years 1871–75	152	19	16	0·2	7·8	9·5	19
„ 1876–80	174	28	28	1·7	13·5	11·9	22
„ 1881–85	186	45	11	3·5	11·8	12·9	26
„ 1886–90	170	48	7	7·0	12·0	14·5	31
year 1891	196	49	9	11·0	14·0	16·0	34

r far the largest relative advance appears in Fresh Meat, the consumption nported Bacon and Hams having been nearly stationary in recent years. to imports have notably declined; and the Foreign supplies per head of at and Flour are but little greater in 1891 than in some recent groups of s.

Exports.

e Exports of Agricultural Produce from this country do not present so y features of note. A smaller number of horses was exported in 1891 than e three preceding years. The value of this export, 525,000*l.*, is below that

recently recorded. The value per head of the 11,234 exported horses is, however, still far above that of the imported horses whose numbers have risen to 21,672 in 1891, more than half coming from Germany. Cattle exports, though larger than in 1890, were below the average of earlier years, while exports of sheep were greater. The collective value of both Sheep and Cattle exported from the United Kingdom little exceeds 100,000*l.*—a very small set-off against upwards of 9,000,000*l.* worth imported in the past year.

Foreign and Colonial Statistics.

Among the tables showing the position of Agriculture in our various Colonies and in Foreign Countries, particulars more or less complete up to 1891 have been inserted for Austria, Hungary, Belgium, Denmark, France, Germany, Italy, Sweden, Russia, and the United States.

Relative Wheat Areas in different Countries.

In the eleven countries which supply a statement of the Wheat crop of 1891. the acreage varies from close upon 40,000,000 acres in the United States, to not much over 2,000,000 acres in the United Kingdom. Russia has not supplied an official figure, it is believed the growth of Wheat in that Empire now covers an acreage somewhat under the 28,800,000 acres of 1883-7. The Wheat area of India is given as 24,000,000 acres. No other countries, except France and Italy, grow annually over ten million acres of wheat, and in 1891 the acreage under this cereal in the former country had shrunk, in consequence of the disastrous season experienced by French farmers, to little over 14,000,000 acres—a decline of as much as 3,000,000 acres below the normal average in a single year.

Relative Wheat Crops.

The relative dimensions of the Wheat Crops grown in the year 1891 may be gathered from noting that, reduced to imperial bushels, the United States are believed to have grown, in round numbers, 593,000,000 bushels; France, despite a reduced acreage and poor crop, 214,000,000 bushels; India over 200,000,000 bushels, Italy 137,000,000 bushels, Hungary 135,000,000 bushels, Germany somewhat under 86,000,000 bushels. The crop of the United Kingdom in 1891, although grown on just half the area employed by Germany for this purpose, came next in magnitude, yielding about 75,000,000 bushels.

Yield per Acre in different Countries.

Working out the mean of the last recorded three years, 1889, 1890, and 1891, the yield of wheat in the United Kingdom stands at 30·6 bushels per acre, in contrast with 19·3 in Germany, 18·8 in Canada, 16·9 in France, 16·8 in Hungary, 14·4 in Austria, 13·4 in Roumania, and 12·7 in the United States, while wheat crops averaging only 12, 10, and 9 bushels per acre respectively, are, it would seem, about the normal production in Italy, in our Australasian Colonies, and in the wheat-growing provinces of India.

Publications of the Board of Agriculture.

In addition to the Agricultural Returns, of which the preceding is an abstract, the Board of Agriculture published in 1892 five leaflets upon the following subjects:—

1.—**Agricultural Exhibition in Norway.**
2.—**Hop Production in the United States of America**
3.—**The Apple Blossom Weevil.**
4.—**The Raspberry Moth.**
5.—**The Mangold Wurzel Fly.**

The following Reports have also appeared:—

1.—**On the Plague of Field Mice or Voles in the South of Scotland.**
2.—**On Recent Experiments in Checking Potato Disease.**
3.—**On the Distribution of Grants for Agricultural Education in Great Britain.**
4.—**On Dairy Farming in Denmark, Sweden and Germany.**

Short Notes.

Pony Breeding. By the Earl of Harrington.

There are many sorts of ponies—the Shetland, the Exmoor, and the racing-pony (which is very often an undersized thoroughbred and entered in the General Stud Book). There is a very perfect breed of ponies, which might be called the small Hackney. There are also the Welsh ponies, which I think to be the best sort of all. I shall write about the ponies of which I have seen the most, viz., polo ponies. I believe that these ponies are the ones that in the present day are the most valuable. And they are so, not only because they are serviceable for polo, but because they are found also to be the most suitable for every sort of work. People are apt to think that any pony—from 13.2 to 14 hands, that is pretty well-bred—is sure to be good enough for polo. This is a very great mistake. A pony is worse than useless for polo unless he has perfect—or almost perfect—action. That is to say, his near fore-leg and near hind-leg must move in the same vertical plane; and, of course, his off-fore and hind-leg must move within a similar limitation. Any animal that "dishes," even in a slight degree, will never make a first-class polo pony. To have a chance of taking this rank, a pony must have a perfect mouth or the makings of one. He must have a good temper; and, of course, possess, in addition, beauty of shape to make him worth anything like a big price. How are we to breed him?

All that is necessary is to take such a pony mare as I have described; and find a stallion also such as I have described; and, mating these together, the breeder will be more than commonly unlucky if he does not produce a good polo pony, or, at any rate, a useful animal. The only thing that he must be careful about is, to take care that he selects an animal that is "*pony-bred*" from both sire and dam. Because if either a mare or sire be selected which, from some freak of nature, is merely a small animal that has been bred from large parents, such a cross is nearly certain to throw offspring larger than either parent. What I should recommend persons, anxious to breed good ponies of the polo pony type, to do, is, above all things, to be careful only to breed from *good mares*. Many people run away with the idea that they can breed a good pony out of a mean-looking mare of no known ancestry. They *may* do so occasionally; but they will find it a very unsafe and unsatisfactory plan; with all the odds dead against them. If possible the intending breeder should look at the stock begotten by the sire he intends to employ before using him; and he should ascertain that they are generally good. Some persons may say here, "But where can we see the stock of pony sires? or, indeed, for that matter, where can we see the sires themselves?" Certainly it is not always an easy matter to see the stock of a pony stallion. Unfortunately there are very few instances where

there are classes for one, two, and three-year-old ponies at horse shows. Still, at Hurlingham, in the month of June, 1892, any one might have seen, not only pony stallions of the highest class, but also pony mares that were almost all of them good enough to breed from. The conditions of entry were: "For stallion ponies that in the opinion of the judges would be the best for getting polo ponies"; and "For pony mares that would be most likely to produce good polo ponies." The height, in both classes, was not to exceed 14.2 hands. In both these classes the animals shown were of a good and really valuable sort; and, although very many of them had not been used for breeding, it is probable that most of them will, at some not very remote date, be available for such a purpose. There will most likely be a similar show at Hurlingham in 1893, and persons who are interested in pony-breeding cannot, I think, go to any other place where they will find so many good ponies of polo type brought together.

I have for many years tried hunter and pony breeding; and my experience is that it is very much easier to breed, with satisfactory results, in the latter case than it is to do so in the former.

Young ponies are much less trouble to rear than are any other kind of young horses. They do not get into mischief so much as do other colts; nor do they hurt and blemish themselves to the same extent; and, moreover, a pony colt will get fat where other young horses will starve.

To improve and encourage the breeding of ponies of the type of which I have been writing, classes should be established, at horse shows, for ponies of one, two, three, and four years old. There should also be—wherever at all convenient—classes for brood mare ponies and for stallion ponies. The conditions of entry should be, in the young pony classes, that they are likely to grow into—and in the two adult classes spoken of that they are likely to breed—ponies of the polo type. A Stud Book should, at once, be started for these ponies; and, in it, all the first, second, third, and highly commended ponies at the several shows should be registered. Only ponies that, in the judges' opinion, would grow to the height of at least 13 hands and not exceed 14.2 hands should be entered in this Stud Book. There should be a table of heights—for one, two, three, and four-year-olds—for the judges' guidance. If I may suggest a standard, it should read thus—one-year-olds, 13.2½ hands; two-year-olds, 13.3½ hands; three-year-olds, 14.1 hands; four-year-olds, 14.1½ hands. Of course, if five-year-old and aged ponies were shown, they would have to be between the heights of 13 and 14.2 hands. These heights would be a sort of guide to the judges, but it would not do to tie judges down to them; as, early in the year, ponies would measure less than they would later in the season.—*Live Stock Journal Almanac.*

The Depression in Agriculture.—By Sir J. B. LAWES, Bart., LL.D., F.R.S.

Two or three years ago I was asked to write some articles in favour of land and farming, as it was considered that depression had gone on long enough, and that better times were in prospect. Old people are rarely sanguine, and when all the valuable qualities belonging to youth and middle age have departed, they may, in experience, possess a qualification in which those much younger than themselves are more or less deficient. If I had complied with the request and written some rose-coloured views upon the happy prospects which were in a year or two to be realised, and to gladden the hearts of those

bound to the land either as owners or occupiers, I should feel s uncomfortable now.

It is remarkable of how little value the experience of a very long life in scientific and practical agriculture is in suggesting remedies to present state of affairs. When all the circumstances of an individu are before one, there is no great difficulty in pointing out many cha improvements by which money might be made or saved, but which useless, or worse than useless, if applied to the country generally, th or perhaps even to the neighbouring farm. If the subject were not to it would be amusing to quote the various remedies suggested to imp position of owners and occupiers of land.

It may be admitted that nothing binds a labourer to the land so n nice cottage and a good allotment garden; but necessity compels the employ as little labour as possible; more land is laid down to pastu three years' layers take the place of one, and labour-saving macl adopted whenever practicable. But while by labour-saving machi manufacturer can afford to employ more labour, as he can multiply the he sells one or ten thousandfold, we cannot, with all our boasted impr in practice and science, grow more wheat per acre profitably than we a century ago, or increase the weight of our fattening oxen more tha weekly. Even the well-established fact that the leguminous crops d nitrogen from the atmosphere will not be of much service to agric some considerable time. The soils used in our experiments to show the of nitrogen contain an abundance of all the necessary mineral foods, wh soils are often deficient in them; if therefore the amount of nitrogen is dependent upon an abundance of mineral food which we have to s becomes a question whether it would not be cheaper to expend our the purchase of nitrogen. The evidence of our field experiments various leguminous plants points to the necessity of large supplies of b and potash in order to obtain vigorous growth in them. It is quite that with a fairly good season our fiftieth unmanured crop of wheat a produce equal to the average yield of the wheat crop of the world, certainly above the average per acre of the three countries—the Unit of America, Russia, and India—which supply us with the bulk of our wheat. It is this remarkable property of the wheat plant to find its fo impoverished soil, as shown by these experiments, coupled with cheap transport, which has struck so heavy a blow on British wheat-growing.

With the exception of pigs, which, being few in number, are dear, th all-round decline in the value of those articles which the ordinar converts into money; for with a marked depression in several of ou facturing towns, we may expect a reduction in the consumption of mea a corresponding rise in price, unless some degree of restriction is p imports. Taking, therefore, the agriculture of the United Kingd whole, the prospects at the present time are by no means encouraging who have suffered the least are small dairy farmers renting fairly good land, selling milk, butter, and cheese, and employing no labourers, all being done by the members of the family. This is admitted to be incessant toil and drudgery; but if, as is expected by some, the farming in this country is to be one of small holdings similar to

France and Belgium, the occupiers must be prepared for the long hours of toil and indifferent food which are the necessary accompaniments.—*Mark Lane Express Almanac.*

Steam Power for Minor Farm Purposes.

While it is well-nigh impossible to bring down farm expenses so as to allow of a profit being shown under exceptionally depressing circumstances, yet money saved is money gained. If produce cannot be increased or prices advanced, there is ever a possibility of working expenses being cut down, though care must be taken that this is not done at some sacrifice of efficiency. In the matter of labour we find the man displaced by the horse, and then the horse superseded in its turn by the steam engine. Whether steam is to give way to electricity is not yet certain, though the developments we have seen during the past half century should ensure an open mind for a wonderful advance in speed and a diminution of cost all around us, before the middle of the twentieth century. As things now are, all but the smallest occupiers use steam power for thrashing. Even allotment holders take their wheat and barley to a machine which is owned or hired by the occupier of a larger adjoining holding. Where allotments are provided with a view to find men with work, we continually see the men do no more of the latter than they are compelled. They plough instead of using the spade, and the "thresher" is employed instead of the flail. For holdings of from 300 to 500 acres it is a question whether it is not as economical to hire as to own threshing machinery. If a large set (with the latest improvements, conveyed to and fro by its own traction engine, and bringing also a straw elevator) can be hired at 25s. to 35s. per day, it will be found more advantageous to use such than either to buy a new set or to continue to use out-of-date machinery, which does not clean the straw, or get through a proper day's work, or properly separate chaff and seeds from the grain. Where steam cultivation is practised upon medium-sized holdings, the hire system is also more in favour than locking up 1000*l.* in machinery that can only be used occasionally, and is apt to require costly repairs. If, then, ploughing and threshing are done by hired machinery, steam power is not available for minor farm purposes, unless an engine is hired or owned suitable for such work. Engines of from 7 to 10 horse-power, such as are used for ploughing and threshing, can be worked at low pressure for chaff-cutting. But for root-pulping, corn-grinding, cake-breaking, dairy work, and many such like operations, a small engine of 3, 4, or 5 h.p. is much more suitable. This is easily moved and set, steam is quickly got up, and the consumption of fuel is slight. There should be upon every farm a young man of sufficient intelligence to be able to drive such an engine if he had a fortnight's opportunity and training under a skilled hand. Few men will work really hard, and continuously, at turning a handle, than which there is probably no more monotonous and uninteresting work. Some excuse is frequently found for stopping to examine or clear away; while oiling times are very religiously observed. Horses, too, have as little liking for the horse gear, which involves walking round and round in an everlasting and very narrow circle. A boy is necessary behind the horse with a whip, and he as a rule objects as much to keeping the horse up to a regular and steady pace as the latter does to be kept up to it. When, however, the engine is turned on, any pace can be kept

up hour after hour with the most rigid regularity. If the work "does horses and men soon show signs of distress, and the output is diminishe any extra strain the engine is ever ready, there is plenty of power in and a little more coal and water used is all the evidence of the strain, perhaps, the beat of the engine, which is louder, and from which the ski learns that the work is going hard. For the working of all kinds of ma whether in the barn, chaff loft, or dairy, a fairly rapid, but absolutely rate of speed is the first essential; and, where machinery is used to a siderable extent, steam power is without doubt not only the cheapest, best motive power. Good second-hand engines can often be picked up than the price of a horse: and, under proper treatment, they will "live" than a horse; added to this, they have the advantage of not eating a Whether work is slack or pressing, profitable or the reverse, the horse's in the manger night and morning, and the men must have their wage week's end. But the engine can be left in its shed or under its she fortnight, and then be turned on in the same condition as when last without having cost a farthing in maintenance. Other industries ha fairly revolutionised by the introduction of steam. Agriculture, fro carried on mainly in the open air, and subject to the hindrances offered and rain, cannot take so much advantage of the cheapening effect o power as can ordinary manufacture.—*R. H.*, *in "The Field."*

The Devons. By JAMES LONG.

An indication of the growing popularity of the Devon breed of cattle found in the fact that fifteen classes have been provided at the great Exhibition for this grand beef and milk producing variety of Britisl This fact shows that Devons have travelled far afield, and that the bre now be considered cosmopolitan in its distribution.

Speaking generally, the Devons can scarcely be said to possess th quality of the Shorthorn, the Hereford, or the Angus; they are hard economical feeders, and unless in exceptional herds, where they hav specially bred and selected for the purpose, they are not the best of The Devon is a grazing beast admirably adapted to summer feeding and requirements of a great grass district like the south-west of England.

Devon cattle may be divided into three classes—the North Devon, th Devon or South Ham, and the Somerset Devon—all having a wider dist than their names suggest. The last named is the most popular, and ma the prestige of the breed at Smithfield and other exhibitions. If small the larger beef breeds, it is equally symmetrical, and its breeders claim flesh is better marbled and firmer, of finer texture, and generally sup quality to that of any other pure breed. Certain it is that this stateme actually borne out when, in 1891, a Devon won the London champi excellent practical judges who subsequently examined the carcase declar they had never seen anything superior. Although by no means diminut Devon is not a large beast, and cannot compare in size with the bulky H or Shorthorn. It is really a breed of medium size.

It is probable that no breed produces more meat in proportion to its siz proportion to the food it consumes; and it may be added that there is

which carries less offal to its carcase. The fattening process is rapid in the stall, and almost equally rapid upon the pasture, for which it is specially adapted.

If we look at the Devon as a dairy cow we shall not find her wanting. Here again, however, there are Devons and Devons. The cows of a selected herd produce milk of an immensely rich quality, though it is smaller in quantity than that produced by the Shorthorn or the Ayrshire. We have met with numerous instances in which the milk from a Devon herd has equalled that of an ordinary herd of Jerseys, which is saying a great deal, hence it is not uncommon for Devon cows to produce a pound of butter per day. The Devon is largely used in the great cheese districts of Somerset and Dorset, and the richness of its milk clearly has something to do with the high quality of the famous Cheddar cheese. Unfortunately the system of recording the daily yield of milk of each cow is not very common in the West of England. Were it recognised by owners of Devon dairy herds, as it is by the owners of Jerseys and Guernseys, and, in some counties, of Shorthorns, we should be in a position to say more of the milking qualifications of the Devon than is possible under existing circumstances.

The Devon has in parts of the West of England pushed out the Shorthorn, which was formerly the established breed, and at the Government Farm at Dartmoor, where it was originally kept, after giving way to the Ayrshire and the Polled Scot, it has been once more established as the presiding breed. One of the largest and best breeders of Devons considers that he could keep three Devons to two Shorthorns, and that he finds they withstand the winter and the wet climate without extra housing or feeding better than any other pure breed or cross breed.

With regard to weight, we cannot do better than quote from published data figures referring to prize and other animals exhibited at the great Smithfield Show of December, 1891, adding some figures obtained by Mr. G. T. Turner for the "Live Stock Journal":—

——	Age.	Live Weight.	Average daily Gain.	Weight of Dressed Carcase.	Per cent. Carcase to Live Weight.
	Days.	lbs.	lbs.	lbs.	
Steer, 1st Prize	558	964	1·73	642	66·60
Steer, 3rd Prize	1,014	1,430	1·41	988	69·09
Steer, Champion Prize	954	1,556	1·62	1,072	68·89
Ox, 2nd Prize	1,448	1,655	1·14	1,120	67·67
Ox, 3rd Prize	1,336	1,672	1·22	968	57·89
Ox, Commended	1,309	1,746	1·33	1,120	64·14
Heifer, 1st Prize	880	1,346	1·53	856	63·60

These figures compare exceedingly well with others compiled at the same time of the representatives of other breeds. The high percentage of carcase to live weight was only exceeded in a few instances among the numerous animals of which particulars were forthcoming; indeed, the two-year-old steer beat all other breeds but the Shorthorn. As much, however, cannot be said of the weights; the Devons, with one exception, weighing less than any of the other animals tabulated. It was, however, in the average daily gain of live weight that the Devon showed to the worst advantage. Whereas two-year-olds of the large and cross breeds frequently exceeded 2 lbs. per day, the Devon, as shown

above, reached only 1·73 lbs., while the three-year-olds—oxen and heifers—including the champion of the show, attained still higher weights. It should, however, be mentioned that the champion Devon steer was said by Mr. Turner to have the least wasteful carcase of any animal he ever saw. In this animal the bone was very fine, and the meat grandly marbled. In some other cases fault was found by the butchers on account of the excessive quantity of fat, but the quality and flavour of the meat seems to have been highly praised. Take it all in all, the Devon of the show-yards is hard to beat.

Youatt was not far wrong on one occasion when, alluding to the merits of this breed, he said, "The best of them are the best in the world."—*Western Times.*

Symbiosis. By A. P. Aitken, D.Sc.

If a tiny drop of blood be examined under the microscope there will be seen two kinds of bodies floating in it—viz., the red and the white blood corpuscles. The former are round, saucer-shaped bodies whose business it is to carry oxygen to all parts of the body, while the latter, comparatively few in number, are of no particular shape; and if one is kept steadily in the field of the microscope and watched for a minute or two, it will be found to be constantly altering its shape, and creeping about exactly in the same way as some small animalcules do in water—the amœba for instance. It has for long been a puzzle to know what was the particular business of these erratic creatures. They were found in other places besides the blood, they were sometimes seen passing through the thin walls of the small capillaries into the tissues beyond and entering lockfast places, so to speak. It has recently been suggested by Metchnikof that the function of these wandering organisms is to patrol the body and protect it from the attack of germs of disease. Whenever any breach is made in the walls of the body by bacilli and such like minute parasites the white corpuscles muster in force at the seat of the attack and wage war against them, devouring, digesting, and destroying them; and on account of this power they have received the name of phagocytes or germ eaters, and it is to the abundance and vigour of these military cells that the power of healthy persons to escape infection or ward off disease has been attributed. This is an example of symbiosis where organisms are nourished by others for the sake of the services which they render.

One of the most interesting instances of symbiosis in the vegetable kingdom has recently been discovered in that humble class of plant called lichens. Hitherto these curious little plants, which are found clustering on bare rocks and walls where nothing else can grow, were considered a separate class of the vegetable kingdom, and many learned treatises have been written describing their various genera and species, and their forms and features. But not many years ago an eminent botanist discovered that they were not single plants but a combination of two very different kinds of plants closely associated together for their mutual benefit—viz., a fungus and an alga. In order to understand how cleverly these two kinds of plants can live together a word or two regarding their structure and capabilities must be premised.

Fungi are very familiar plants, such as blue moulds and white moulds, and the larger and more highly organised members of the class known as mushrooms and toadstools. Their leading peculiarity is that they do not make wood as most plants do. The chlorophyll cells to which ordinary plants owe their green colour, and by means of which they make their woody tissue, as well as starch,

sugar, &c., from the carbonic acid of the air, are absent in fungi, hence these can live only on the bodies of other plants or animals where they find their food ready made. They are simply parasites. Algæ, on the other hand, are abundantly supplied with chlorophyll, and many of them are single-celled creatures floating about independently, and utilising the carbonic acid of the air for the purposes of their growth.

If a lichen is examined under the microscope it is found to have the structure of a fungus, one peculiarity of which is the possession of long thread-like silky roots or filaments, which can penetrate the pores in the skin or surface of the organism on which it feeds, and these it can also send down into the tiniest crevices and cracks on the surface of stones, rocks, the bark of trees, &c. It has also cellular branches growing up into the air, and in among these branches, and closely secured by them, there are found a number of green cells that have little or nothing in common with the character of a fungus. These are little algæ which have been taken prisoners by the fungus, and securely fastened in bonds which entirely prevent their escape, but they are softly held and kindly treated, and permitted to increase and multiply, and, moreover, they are fed by the fungus, whose thread-like roots, or hyphæ as they are called, search for mineral matter in the stones, &c., and in return for that supply the algæ fix upon the carbonic acid of the air, from which they manufacture the vegetable matter which the fungus cannot make for itself, and by reason of which it grows and spreads and flourishes. Owing to this so-called symbiotic relation of very minute plants, bare walls and rocks become clothed with a coat of many colours which, in its eventual death and decay, leaves a tiny skin of vegetable mould where mosses can find a home, and these in their turn make a deeper mould, on which by and by grasses can grow and form a sod.—*The Scottish Farmer.*

Grasses and Clover. By Professor MacAlpine.

There are certain grasses adapted for haymaking and certain for pasture. The most suitable for the latter purpose is the grass that will best stand the trampling of the animals. Of two grasses—one plump and oval-shaped and the other flat like a flounder—choose the latter for pasture, and in selecting do not look at its head, but at its root. To this category belong perennial ryegrass, crested dogstail, and the blue grass of Kentucky. Of clovers, red clover and alsike are useless for pasture, but white clover, which creeps along the ground, is the very thing for the purpose. We are practically restricted to these when we want pasture grasses. For hay, there is a greater variety—cocksfoot, timothy, meadow fescue, and Italian ryegrass. Grass and clover should be mixed, roughly speaking, in about the same proportions. The grass contains the starchy material; the clover albumin. Both are miners and they will bring out whatever is in the land. If a sandy desert were being brought under cultivation clover would be about the first seed to sow. When a railway cutting is made and fresh land exposed to the atmosphere, the first crop one finds is clover. The reason is that clover draws its nitrogen from the air. Keep your soil open and let in the air, and you will grow clover. By and by it so enriches the land with nitrogen that grass grows, and then the clover itself has to go being driven out by the grass which draws its nitrogen from the soil.

Red clover has the longest tap root, and shoots it continually downwards. So long as the soil is good it grows well, but whenever the tap touches the cold

subsoil the clover is done for. Alsike does not go down so deep. The root is much shorter; consequently the plant hangs out for a longer time. White clover, on the other hand, has very little of a root. It creeps along near the surface, and will last a long time with a little moisture and fairly good food. It lasts the longest of the clovers.

Grasses have no tap roots. They neither go deep down nor grow high up in the soil. They branch from the roots. Each new branch makes an independent root for itself. Timothy grass is tall, and has to have a corresponding depth of root. Perennial ryegrass has low-down leaves, and has shallower roots. The farmer who has deep land, and has nothing but grass on it, is no practical farmer.

The production of seed means a heavy drain on the plant. Hence the plants which seed most frequently and abundantly have the shortest lives. Trees do not produce much seed, and they endure for ages. Perennial ryegrass produces much seed; it cannot last more than three or four years. Meadow fescue is sparing in its seed.

If a plant is to last you must pay for the seed. A cheap seed cannot last, and cowgrass should only be bought on guarantee, because it is not distinguishable as seed from red clover. If it does not grow and last as per guarantee the seedsman should make good the difference.

The next point is that the farmer wants to fill his land with plants. In order to do this he must know how much seed it takes to cover an acre. The quantity of red clover necessary for this purpose will be different from the quantity of white clover. Farmers and seedsmen speak of the average of seed. Seeds are either good or bad; there is no average in them. What the farmer wants to know is, how many of the seeds in the pound will grow and how many will not grow. There is no average in a handful of coins, some of which are bad and some of which are good. The bad are bad, and the good are good. Seed should never be bought except you have a guarantee of the amount of growing power (germinating power) in it.

The object of mixing grass with clover is to convert an acre into an acre and a bit: the man who can mix his seeds well may make his acre an acre and a half. There are intervals between the top seeds—like red clover and alsike—and by judiciously filling these intervals up the desired result is obtained. The second object of mixing is to improve the quality of the produce. The horse in a well-ventilated stable is a better animal than the horse in an ill-ventilated stable. By judiciously mixing seed you introduce so many air-pipes into the soil, and so keep the soil open, with advantage to all the seeds, and this secures the third object—the increase of the feeding value of the pasture.

First, then, select plants that will grow. Sometimes when seeds do not grow, the advice given is, put more in. But if the quantity first put in will not grow why waste more. Find out what will grow.—*The Scottish Farmer.*

Domesticity. By P. McConnell, B.Sc.

We are in the habit of using the term "domestic" in relation to the animals which we utilise on the farm to distinguish them from those which run wild, and researches into the life of primeval man show that very far back in his history we find the remains of these animals associated with his own. Our live stock have been more or less "domestic" from antiquity, but at one time they must

ıave existed in a wholly wild state. The domestication of the cow must have aken an immensely long time, for we have not by any means reached perfection n this line yet.

The authentic history of ancient Egypt reaches back more than six thousand years, when that country first became consolidated into one empire under the First Pharaoh of the First Dynasty. The cow does not appear from the ancient monuments—as we would expect—to have been so well domesticated then as now, because, when represented in the act of being milked, she has her two hind-legs tied together with a rope, as if this were the usual condition; while with us now it is only a small proportion of animals which require to be so treated, and none would require it if the attendants were as careful as they ought to be. There must have been in Egypt, as in all other countries, an almost illimitable reach of pre-historic antiquity, during which the ancestral savages were developing themselves and their cattle also, up to that point of civilisation at which it was possible to leave "literary remains" which can be read by us moderns. From the Egypt of B.C. 4790 to the Dairy Show of A.D. 1892 is a "far cry," but before and during all that period civilisation was progressing in various countries, and the domestication of the ox was being gradually carried on. That domestication is not yet by any means at a state of finality is brought home painfully to our pockets by the result of many of the traits and dispositions of our cattle. The ancestral fear of the wolf or wild dog is manifested when a strange animal, or, worse still, a pack of hounds, appears in the pastures, resulting in a "raised" or nervous state, which generally ends in cows goring one another, slipping a calf, and certainly in a lessened milk yield at the next milking.

Another result of the want of thorough domestication is manifested at our milking trials. We often hear owners of cows complaining that at these trials the yield of their cows is very much inferior to what it is at home. The food is the same, the attendants are the same, but the change from the home surroundings acts detrimentally on the milk yield of the animals. This is neither more nor less than imperfect domestication. There are always some animals which are not thus affected; their naturally wild temper has been eliminated in the course of ages of breeding and selection, and careful training has fostered the placid temperament which is conducive to milk yielding, and which is less easily upset by the distractions of the showyard. Domesticity means living in peace and quietness at home, and the animal which is naturally the most peaceful and phlegmatic is the most domesticated—other things being equal. Thus the milking trials are not only a means of testing the milk-yielding power of the animals, but also their domestic qualities. If two animals are equally good milkers at home, while one is of a nervous, irritable temperament, and the other of a placid disposition, the latter will come out best at a show, so that thus the domestic quality is rewarded with prizes, and if the owners are particular about the nature of their future animals they should breed from such.

We want to encourage everything which tends to improve the all-round character of a dairy cow, and domesticity—the degree of placidity of disposition which enables them to be "above" the little worries of their ordinary life or the great worry of a show—is a main factor in this good character. From this point of view, also, the milking winners are worthy of double prizes, one for milking as at

present, and one for the greatest degree of domestication, for a large milk yield is the measure of this.

Measured according to Egyptian history, the domestication of the cow—such as it is—must have taken an exceedingly long time; on the other hand, we must recollect that there has probably been more done in Britain for the development of live stock during the last 150 years than during the preceding 6000 years. This is rather comforting, because if all the cows in Ancient Egypt were kickers, and there are still, say, five out of 100 addicted to this practice, the rate of improvement must have been very small.

Within the last generation the improvement must have been in something like geometrical ratio, and there is therefore great reason to hope that perfect domesticity will be shortly attainable. We, nowadays, understand far better heredity of disposition as well as of bodily qualities, and the principles of natural and artificial selection, continually put in practice, must before many more years further domesticate our animals.

A savage bull is a great hindrance to improvement in this line; his female progeny must inherit some of his nervous and irritable temper, and be thereby lessened in value for milking purposes, so that the employment of placid-tempered bulls is a great help. Again, horns are a great drawback to this development of good qualities. An animal which retains such murderous weapons of offence as these can never become thoroughly placid and docile. Domestication has resulted in a very much larger milk yield. The cow of to-day gives more milk and more butter-fat than her ancestors of bygone generations, and this quality may be still further emphasised by such things as the breeding out of horns, the disuse of savage bulls, and the elimination at our shows of the nervous animals which do not milk well outside their own sheds.—*Live Stock Journal.*

Artificial Manures. By Messrs. Proctor and Ryland.

In these days of depression, consequent on bad seasons and a long-continued range of low prices, it is only by sound farming, by making every effort to increase the production per acre, and by producing, so far as possible, nothing but the best, that a profit can be made. The use of good seeds and good manures may therefore be regarded as the first necessity of the farmer who would be successful. We have now quite sufficient evidence to show how true this is, but perhaps one example may be permitted. At the last great Agricultural Show in Paris the Government devoted one room to show the results of some experiments in potato-growing. In the first place there was one sack which represented the average yield of potatoes, on a given small area, for the whole of France; then came two sacks, these representing the average yield of potatoes on a similar area in the best cultivated districts; following these were four sacks, showing the yield of ordinary varieties of potatoes from the same extent of land with fairly good cultivation and farmyard manure; and then, lastly, eight sacks showing the yield from a plot corresponding in measurement to the others of the best variety that the Government could recommend, aided by a special manure which contained all the requirements of the crop. The sacks were of uniform size, and illustrated the results of experiments carried out in various parts of France for the Minister of Agriculture by the famous chemist, Dr. Aimé Girard, in order to see what could be done by the use of (1) good

varieties, and (2) special manures for a given crop. It was an object-lesson that we shall not soon forget, demonstrating as it did so clearly the possibilities we have of still further increasing the produce of our acres.

The day has gone by when we can afford to do without special manures for special crops—a lesson urged upon us by all experiments. Those which have been conducted by leading agricultural chemists tell us that, good as is farmyard manure, artificials are necessary. Over a long series of years their experiments with wheat gave an average of 13¼ bushels per acre on unmanured land, 33½ bushels on land manured with farmyard manure, and an average of 36¼ bushels per acre on land dressed with various artificials. With hay the results were still better—2535 lbs. being produced per acre from unmanured land, 4804 lbs. by the use of farmyard manure, and 7711 lbs. by artificials.

Thus it is seen that in any case artificial manures give an increase. But other experiments show that, when properly combined and specially prepared for the crop, the yields are still further improved. The "Mark Lane Express," a short time ago, gave the analysis of all the experiments made by various societies over a series of years, with the following average results:—

	Average Yields per Acre.				
	Turnips.	Mangolds.	Potatoes.	Barley.	Hay.
	tons.	tons.	tons.	bushels.	cwts.
Phosphates *only*	13½	16¼	5	..	36½
Phosphates and Nitrogen ..	14¼	..	..	48¾	..
Dung and Artificials	16⅓	20½	5¾	..	..
Combined Artificials	21	25¾	11¼	45¼	51¼
Average yields for Great Britain	12½	17	6	34	28
Increase in yield per acre by use of Combined Artificials over average for Great Britain	8½	8¾	5¼	11¼	23¼

It must not be forgotten that these are the average of over five hundred experiments, in many of which there were failures, while many of the combinations were merely tests to try and find out what the plant required.

In any review of the question of manuring, a word or two should be said of one advantage which artificial manures possess as compared with farmyard manure. The latter may be anything—it may be a rich manure made under cover from animals fed with cake and corn, and carted at once to the field and ploughed in, or it may be merely trodden straw, with dung from poorly-fed animals, that has been exposed to all weathers and the goodness washed out of it. On the other hand, an artificial special manure, with a guaranteed analysis, is a substance which has no variation in quality, and which can be put on the land with a certain knowledge of what it is.

The Farmer's Library.

NOTES AND REVIEWS OF NEW BOOKS.

1.—*The Journal of the Royal Agricultural Society of England.* Third Series, Vol. III., Parts I. to IV.

PART I.

THIS volume of the Journal is occupied to a large extent with articles of historical value, which have comparatively slight bearing upon the farming of the present day. The first paper of more immediate interest is one on "The Value of Pedigree," by Colonel Sir Nigel Kingscote, K.C.B. He writes:—

"My object is to show what advantages have accrued from 'pure' breeding, not only to the breeder, but to the consumer and community at large. At the same time, it will be my endeavour to point out disadvantages which may have accrued from this too close clinging to 'pure' blood, and to indicate its effect both as regards the production of meat and as affecting the quantity and quality of milk. I propose to confine myself almost entirely to the Shorthorn, or what at one time was called the 'Durham' breed of cattle; not only because it is best known to myself, but because it is the oldest 'pedigree' breed of cattle in existence, and therefore the best adapted to the purpose in view."

It is impossible to carefully read this paper without coming to the conclusion that, except in so far as higher prices are obtained for pedigree stock than for unpedigree, the disadvantages would appear to outbalance any advantage accruing from the custom of pure breeding, unless special care is taken to avoid in-breeding. Thus on page 41 we read:—

"It has often been stated that pure-bred Shorthorns are deficient in milking qualities; and that there is some ground for this contention I admit, though I cannot allow that this failure of milking properties was inherent in the breed, having been brought about more by the condition the animals themselves were kept in."

As to this deficiency in the milking power of pure-bred animals the author quotes Lord Suffolk, who has stated—

> "That his experience led him to the conclusion, that by too close in-breeding much of the milk-yielding capacity was sacrificed. Alluding to a well-known herd, he said he did not believe that the highly-bred Duchesses which it contained would give a pailful of milk in a week, and it was well known that the owner of the herd got wet-nurses for all his calves, who probably never saw their mothers again after they were born. Such a result as that could only be attributed to in-breeding—at least, he could assign no other cause."

In our opinion, the breeders of pure stock have mainly themselves to blame for this state of affairs. As sales depend almost entirely on the appearance of the animals, this point, and this only, is attended to, and in the very home of the best Shorthorns it is rare to find any record kept of the milk yield. In fact, the milking properties have not been improved by selection, while the fattening properties have, and these two being diametrically opposed, the explanation of the deficient milk yield of pure-bred stock may be easily accounted for.

Another drawback to pedigree stock is stated to be "constitutional and hereditary disease" resulting from "in-and-in-breeding without discrimination." Moreover—

> "Such breeding certainly tends greatly in the direction of sterility, as is evidenced by several of the highest bred strains of blood having almost died out, but when crossed again with alien or nearly alien, but still pure blood, have been resuscitated."

The author touches upon the question as to whether abortion may be attributed to in-and-in-breeding, which, as is well known, some authorities maintain to be the case. There can be no doubt, as he says, that—

> "Want of robustness can be rapidly induced by in-and-in-breeding."

On the other hand, in addition to the high prices which such animals obtain, the author maintains that—

> "As to the fattening of pure-bred cattle, no one can deny that they fatten quicker, and come to maturity sooner, than mongrel-bred ones. Think for one moment of the difference between a cross-bred coarse big-boned steer and

a pure-bred fine-boned one. It will take as much food again, and as much time again, to fit the former for the butcher as the latter. Even let the former possess equal weight and fatness, which animal will the butcher take and give most money for? There can be no doubt it will be the pure-bred one. Again, will the badly cross-bred cow or steer come to maturity as soon as the pure or well-bred one? Would it be possible to bring into the market the admirable steers which we see now at two years old, or at least under three years, if it had not been for the large admixture of pure blood? There can be but one answer to such queries, and that is, that we have proof positive of the very great advantage of pure blood both in the fattening of animals and in bringing them early to market, giving the consumer at the same time fine-grained meat of a quality which a few years ago he could not obtain."

In an article on the "Evolution of Agricultural Implements," by Dan Pidgeon, which is continued in Part II. of the Journal, interesting and useful information is given, of which the following may be taken as an illustration. Referring to drills, the author says :—

"A good drill should,—First, deliver uniformly the same quantity of seed per unit of surface, whether travelling on level ground, along the side of a hill, or up and down hill. It should adapt itself not only to all kinds of seeds, but to all conditions of such seeds. The quantity of seed sown per unit of surface should be precisely and easily regulable.

"Secondly,—the coulters should make the seed-furrow neither too deep nor too shallow, and the sides of this furrow should fall in easily upon the seed.

"Thirdly,—the steerage of the machine should be easy and accurate."

A paper upon "Horse-Breeding for Profit," by A. E. Pease, M.P., contains many valuable suggestions, and points out that—

"Half, and more than half, the want of success in all departments of horse-breeding is the lack of enterprise in selecting the sire."

With regard to the breeding of hunters, the author considers that—

"The uncertainties and risks in breeding hunters are very considerable, and it is impossible when you have bred one

'clipper' to count on getting even off the same mare by the same sire another equally, or even approximately, as good;" while "of one thing there is no doubt, that to breed hunters successfully it is necessary to keep clear of carting-blood, and you must not be afraid of keeping your horses till they are five years old if you wish to sell them well. Really big blood hunters take six years to get properly furnished (*sic*) and conditioned, and the difference between the same horse at four and at six or even seven years old is often astonishing."

He gives it as his opinion that—

"The harness horse can be bred with the minimum of risk and a certainty of profit."

Carriage horses are treated at some length, while the breeding of hackneys and ponies receives slight attention.

The "Life of the Wheat-Plant from Seed to Seed," by W. Carruthers, F.R.S., gives eight full-page illustrations of the wheat-plant in its various stages of growth, with descriptive letterpress.

"English Markets and Fairs" forms the subject of a carefully-written paper, by R. Henry Rew.

Part II.

This part opens with a well-illustrated paper upon the "Vermin of the Farm," by J. E. Harting, which deals with these creatures under the four heads :—

"(1) The graminivorous rodents; (2) the insectivorous mole and the hedgehog (the shrews being harmless); (3) the carnivorous destroyer of poultry and other live stock; and (4) the so-called winged vermin, which are more or less omnivorous in their habits."

The subject is treated in a popular way without sacrificing scientific accuracy, and yet with an ever-constant relation to the practical side of the subject. This may be illustrated by the following quotation, relating to the extermination of rats :—

"When a rat kills a pigeon, or chicken, it rarely eats more than a portion, and it is easy to poison the portion remaining and so secure the rat on his return for a second meal. If poisoned with arsenic, or any other irritating poison, it is as well to put shallow vessels of water within

reach; for the rats, consumed with thirst, will come to drink at them and die there instead of in their holes, where their decomposing bodies would subsequently create a stench.

"Should a rat perchance die behind the wainscot, or under the floor of a room, where from the difficulty of ascertaining its exact position it cannot well be removed, and where in warm weather it would become very unpleasant, it is a good plan to catch a few bluebottle flies, and, closing door and window, turn them loose in the room. In a short time they will settle down above the spot where the rat is lying, and the latter may then be removed with the least possible trouble."

W. E. Bear draws attention to some "Desirable Agricultural Experiments." As to the necessity of these experiments he says:—

"By the aid of science, and by means of experiments and ordinary experience, man has advanced in knowledge of the principles of his oldest art; but the progress has been slow, and, I venture to think, much slower than it would have been if more systematic efforts than have ever been made had been put forth with the object of throwing light upon questions which are either altogether obscure or enveloped in a greater or less degree of uncertainty. There are points, indeed, of the most essential importance to farming as a business, which might be decided with at least sufficient approach to exactness, to elucidate which no systematic attempt has ever been made, although for generations they have presented themselves to the minds of agriculturists as riddles which men of that class have felt that they ought to be able to answer. With respect to some of these questions, which might have been elucidated by a few well-arranged experiments, it may fairly be said to be astonishing that they have been neglected through all the decades of improving agriculture. There are also other problems, raised by modern research, which it is no discredit to living or dead agriculturists not to have solved; and all that need be pleaded with respect to them is, that they should not be treated with the same neglect as has been displayed in relation to older questions."

In conjunction with this subject, it would be interesting to compare what other countries are doing in the way of agricultural experiments. A statement has recently appeared in a German Journal giving the number of experimental stations

which exist in the different countries of the world. From this we extract the following figures :—

Germany	67
The United States of North America	54
France	53
Austrian Hungary	35
Sweden	24
Italy	17
Russia	14
Belgium and Switzerland, each	9
Denmark	8
Great Britain	8

These figures speak for themselves, and the question arises, How can we increase the number of experiment stations? Mr. Bear considers that :—

> "County Councils might well be asked to contribute some of the money they have to spend upon Technical Education in assisting agricultural bodies to carry out such experiments."

"Contagious foot-rot in Sheep" is next treated in an illustrated article, by Prof. Brown, and then we come to by far the most valuable and practical paper in this part of the Journal, one by Gilbert Murray on "Variations of the Four-course System." The subject is treated not merely historically, but reasons are given for the changes which time has produced, and many valuable suggestions made as to the prospects of the future.

The author says :—

> "Improvements in the cultivation of the soil, and in the breeding and feeding of live stock, were aided and accelerated by the introduction and development of the four-course system during the long period of two hundred years. Changing circumstances necessitate a new departure."

The author in the course of his paper thus points out some of those changes :—

> "Restrictive covenants as to cropping must, in the first place, be removed. The chief condition now requisite is to keep the land clean and to grow good crops, but a quitting tenant, whatever his course of cropping may have been, must leave the usual proportion of fallows and seeds. Most farmers are now convinced that the best means of meeting outside competition is to make the farm as far as

practicable self-supporting, both as regards stock and fora
This cannot be done by laying the land down to permane
pasture.

"The advice to reduce the arable area to the low
possible limit must surely be a mistake. Every farn
knows that a mixed occupation will keep more stc
than the same land will do if laid away to grass.

"My advice would be to adopt the six-course shift,
keep more stock, to consume the chief part of the prodı
on the land, to grow a series of catch crops whene
practicable, and to improve the existing grass land
summer folding. I am persuaded that if this syst
was more generally carried out, it would not only impr
the land, but also the financial position of the tenant."

There is a Report on the Trials of Ploughs held by the Soci
at Warwick, and the original articles close with an endeavo
on the part of Lord Cathcart, to draw greater attention to a
enlist workers in the domain of Economic Ornithology.

How much more attention is given to these subjects in fore
countries is amply evidenced not only in Lord Cathcart's pa
but by Reviews of foreign works, more or less allied to
subject, which appear in another portion of the Journal.

PART III.

"Allotments and Small Holdings." By Sir John Ber
Lawes, Bart., and J. H. Gilbert, LL.D., F.R.S. In an exhaus
paper the authors, having considered the number of allotm
and small holdings in Great Britain, pass on to "the conditi
essential to the success of small holdings." They cons
that—

"If small holdings are to be established to any c
siderable extent in Great Britain, there can be no dc
that success must be looked for, not in ordinary rota
farming, but in an extension of dairy-farming where
soil and climate are suitable, in an increased productio
poultry and eggs, and also, where the soil and climate
suitable, on what is in reality market gardening rat
than agriculture."

And the results at which they consequently arrive are
pressed in these words:—

"It follows, from the facts adduced, that there is li
hope that a system of small holdings can ever be car

out in this country to anything like the extent which experience has shown to be practicable in the countries that are so frequently held up to us as models by those unacquainted with the conditions essential to success, or even with practical agriculture at all."

Belgium is frequently quoted, the authors say, as a model for ırselves in the matter of small holdings. Their opinion is, ›wever, as follows:—

"Belgium and England are, indeed, in some particulars, well suited for comparison, but in others for contrast rather than comparison. Thus, Belgium and England have each a much greater population for a given cultivated area than any other European country; and the number is very nearly the same for a given area in the two countries. But, whilst England produces more grain, more potatoes, and a greater weight of live-stock, per acre, than Belgium, Belgium, on the other hand, gives a greater proportion of dairy produce, poultry and eggs, and fruit and vegetables; and small holdings are very characteristic of the portions of the country yielding these results. By far the greater number of the small holdings are in the light land districts, and in those districts the cultivators are, as a rule, not the proprietors. There are, however, some small farms in the heavier land districts, and here the cultivators are frequently the owners also. It is admitted that the larger farms yield a greater produce per acre of ordinary farm crops and stock than the smaller ones.

"Owing to the peculiarities of the soil and climate, especially of the great light land district where the small holdings prevail, a very characteristic practice is the growth of two crops in one year. Thus, with a light soil, high summer temperature, long days, and an open autumn, the growth of what we call 'catch crops' is a very prominent feature. Under these conditions the harvest is early, and, after the removal of the grain, a catch crop can be taken. After rye, turnips are almost invariably taken; turnips or spurrey after other corn crops, or carrots are sown in the wheat or flax. Indeed, it is stated that, owing to the adaptation of soil and climate, one-eighth of the whole of the cultivated land grows two crops a year. It is fully recognised in Belgium by those officially acquainted with the subject, that the success of the small holdings depends very much on the facts,—that the soil is easily worked; that the soil and climate are such as to favour the practice of catch cropping, and that they are also favourable for the

production of industrial crops, dairy produce, poultry and eggs, fruit and vegetables; whilst the dense populatior generally, and the large number of towns, afford convenient markets for the produce, and for the return of towr manures."

There is no doubt that over-sanguine hopes of the possibility of small holdings have been put forward in England; and if th authors do not share these hopes, they speak with no uncertai voice as to the desirability of certain changes which they stat as follows:—

"Although to establish a large number of the populatior on the land in small holdings would not only be very costly, but would only to a limited extent, and unde favourable conditions, be attended with success, it i nevertheless very desirable that the sale and purchase o land should be rendered as cheap and easy as possible Further, it would doubtless be for the benefit of th country, that the owner of landed property should be abso lute owner, with power to sell, or lease, or will it, t whomsoever he pleases, and that his successor should hav the same power as himself. It would, in fact, be desirabl to remove all restrictions to the transfer of land, and to it acquirement on equitable terms, so that there should b no artificial obstacles in the way of the small holder, wh would then succeed if the conditions were suitable, bu would not if they were otherwise. It would, at the sam time, be desirable that those who vote the land and th money for small holdings should also be held responsibl for the failures and losses. The country would thus hav the security of the instinct of self-preservation in rat payers, or whoever else was responsible, that large sun would not be expended in utopian, retrograde, and losin schemes."

The article on "Vermin of the Farm" commenced in Part I is continued, and the rest of the 'Journal' is devoted to a repo of the Society's Warwick Meeting, of the Miscellaneous Imple ments exhibited there, and to "The Farm Prize Competition 1892."

PART IV.

In a paper on "Field Experiments on the Fixation of Fr Nitrogen," Mr. James Mason gives some interesting results experiments he has conducted, the results of which may l summarised as follows:—

"On a soil shown to be very low in 'condition,' so far as regards the production of cereals and other gramineous plants . . . after a very liberal manuring with phosphoric acid, lime, and magnesia, . . . we have grown a strong crop of beans, followed by a fair crop of clover hay, and this without the application of any nitrogenous or organic manure.

"The quantity of nitrogen collected in the bean crop may have been about 152 lbs. per acre. In the two clover crops the quantity of nitrogen may have been 224 lbs. per acre. The quantity remaining in the soil, in the form of roots, and accumulated in the soil itself as the result of the leguminous growth, would be an essentially important item from a manurial point of view. The nitrogen from these two sources would necessarily be almost the only nitrogen that could be supplied to the nitrogen-consuming potato crop. As was ascertained at the commencement of the tentative experiment with the cereals the amount of available nitrogen in the soil must have been exceedingly small.

"We have thus, from beginning to end, collected a quantity of nitrogen in the three crops, beans, clover, and clover, equal to 376 lbs. per acre, or equivalent to more than one ton of nitrate of soda per acre, over a period of three years. This is equal to 750 lbs. of nitrate of soda per acre per annum.

"These experiments certainly go to show that the leguminous plants, beans and clover, thrive well on their own account in a soil very deficient in nitric nitrogen, but well supplied with mineral food, and that they are capable of accumulating nitrogen in the soil itself, and by their roots capable of supporting an after-crop requiring so large a supply of nitrogen as potatoes."

"Wild Birds Useful and Injurious," by C. F. Archibald, is—

"An attempt to describe briefly the salient points in the life history of some of the species most intimately connected with the practice of agriculture and gardening."

The author very truly says that—

"Birds affect both sides of the farmer's balance-sheet to an almost incalculable extent. Unfortunately, the means by which they reduce the profits of cultivation are only too apparent, whilst the good services rendered by them, both on the farm and in the garden, are in many cases only

> discernible by those who have studied their ways thoroughly, and who have besides a fair knowled insect pests, and their boundless power for evil."

And in his paper he considers the Hawks, Owls, Thr and Chats in these two-fold relations.

The "Utilization of Straw as Food for Stock," by J Darby, if it does not contain much that is new, is a very *résumé* of our knowledge, and is well timed. It points ou great advantage of steaming or fermenting the straw in to bring out the "grateful aroma, delicate flavour, and palatable condition, in addition to rendering the substance digestible."

There are four contributions on "Yew Poisoning," subject has attracted much attention of late.

Dr. Voelcker reports on the "Feeding Experiments on and Cattle at Woburn," from which he draws the conclu that—

> "The utilisation of home-grown produce in the fo a mixture of beans, oats, and barley may be carried the case of bullocks to quite as much advantage as fe with linseed-cake;" . . . indeed, . . . "that linseed may, without fear of loss, be replaced by using a mixture of home-grown foods, including beans, whe the price of linseed-cake rises above 9*l.* per ton delive

But with sheep the result is different, for—

> "Even with linseed-cake at a high figure, it pays to feed sheep with it when eating off roots than to use home-grown barley to partly lessen the cost. Also malt as a feeding material for sheep does not rep extra cost."

2.—Works on Dairying.

1. *Dairy Education at Home and Abroad.* By Alex. Holmes. Middlesbrough: Jordison and Co.
2. *Lectures on Dairy Education delivered at the Cheshire Institute.* By T. Rigby. Chester: 'Courant Office.'
3. *The Dairy.* By James Long and J. C. Morton. Lo Vinton and Co.
4. *Second Annual Report of the Dairy Commissioner f Dominion of Canada for* 1891–92. Ottawa: S. E. Daw

5. *Cheese and Butter-Making.* By JOHN OLIVER and MARGARET BARRON. London and Derby: Bemrose and Sons, Limited.
6. *The Dairy and its Equipment.* By HENRY J. WEBB. Whitehaven: T. Brakenridge and Co.
7. *Milk Fermentations and their Relations to Dairying.* Washington: United States Department of Agriculture.
8. *Modern Butter-Making.* By ETHEL M. NEVELL. London: Wilkes and Co.
9. *The Art of Butter-Making.* By HENRY J. WEBB. Whitehaven: T. Brakenridge and Co.
10. *Butter-making for our Pupils.* By MARY and JESSIE BLACKSHAW. Macclesfield: Claye, Brown and Claye.

THE above are only a few among many books and pamphlets which have recently appeared upon dairying, due largely to the increased interest which is now being shown in dairying, and the active part which the County Councils are taking in promoting skill in butter-making and cheese-making. But while much good has followed the great interest lately taken in dairy instruction, it has unfortunately also resulted in some evil, the chief of which has been the production of a large number of handbooks written by those who are engaged in teaching. It so happens that those who are well acquainted with the practice of the art of butter or cheese making are frequently very ignorant of the principles which underlie their art. They have not had the scientific training which alone enables them to discover these principles for themselves, and so they have to borrow their information from others, and are not competent to discriminate between correct and incorrect data and deductions. Nor have they either the means or the training which would enable them to test conflicting statements. Hence nearly all these books contain errors of more or less serious import. So deeply and widely is the Bath and West and Southern Counties Society interested in promoting dairy education, that, in drawing attention to these writings, we feel it our duty to point out some of the errors which are most frequently met with in them.

One of the chief causes of this increased interest in dairying is undoubtedly due to the great competition which we find necessary with foreign countries; the origin of which is set forth in No. 1 of our list. Those who have studied what has been done abroad see that the results are in part due to better and more universal education in dairying given there in past years. Hence, far-seeing men, like Mr. Thomas Rigby, have done their best to show (No. 2) how valuable this education might prove among ourselves.

Side by side with the practical instruction given abroad there

has been much investigation by scientific experts, and the knowledge thus obtained has been disseminated by properly equipped colleges, and by travelling instructors and scientific experts, not only among teachers, but among the farmers themselves. And there exist many excellent works upon both the science and practice of dairying which can be consulted by those engaged in teaching.

Unfortunately no such work exists in the English language, while there can be no doubt that a sound work on dairying is greatly needed. Probably it is this feeling which prompts many to try their hand on a work which shall satisfy the demand. Unfortunately we have not yet come across one which is entirely free from error. Some of these errors are due to simple carelessness on the part of authors in correcting proofs of their work. Thus in one work, No. 6, we find the specific gravity of milk stated to be 1·30 instead of 1·03, a serious error, and undoubtedly due, not to any want of knowledge on the part of the author, but carelessness in revising the proofs of his work.

It is characteristic of most of these works that while they describe with a fair degree of accuracy the manipulations and art which they wish to explain, the moment they touch upon the science of the subject they show that the authors are mere learners from books, have devoted no time to investigation, and are dependent for their information entirely upon the authority of others. Thus, a number of erroneous statements are perpetuated and spread throughout the country, and it will be most difficult to remove the false impressions produced by these inaccurate facts and theories. Let us draw attention to one or two of these.

The Nature of Milk.—Even in No. 3, which in some respects is an admirable book, we find it stated that "Milk is essentially an emulsion of fatty matters in water containing albumin, casein, and sugar in solution." If the author had only thought for one moment he would have recollected that casein has been proved not to be in solution, and that, as shown by Ducleaux, when milk is filtered through porous porcelain, the casein will not pass through the filter.

The influence which this fact, that the casein is not in solution, has upon the phenomenon of the rising of the cream, and the very important part which it plays in the results obtained by different methods of cream separation, are as a rule entirely ignored. Every minute for which milk is kept, the casein becomes more and more viscous, as the bacteria present produce more and more lactic acid, until a stage is reached when the casein solidifies or curdles. Cold, as is well known, retards the

growth of bacteria, delays this development of acidity, and the consequent change in the viscosity of the casein, and this explains the ability of the cream to rise in the deep setting systems, such as the Cooley and Schwartz.

This is well illustrated by an "Experiment in immediate *v.* delayed setting of milk," given in No. 4, and which we will quote in full: "This test was conducted for six days—from 27th of July to 2nd of August—and included six settings of morning milk and six settings of evening milk in each case. The milk was herd milk, and was mixed immediately after milking, before it was divided into two lots. One lot was set at once in a deep setting pail, in ice water, of a temperature of 38° Fahr.; another lot was left in a pail in the dairy room for one hour, and was then set in ice water, under conditions precisely similar. The following table shows the average results from the morning and evening tests:—

—	Morning Milk.		Evening Milk.	
	Immediate Setting.	Delayed one Hour.	Immediate Setting.	Delayed one Hour.
Quantity of milk set .. .. lbs.	35	35	35	35
Per cent. of butter fat in milk	3·53	3·53	3·93	3·93
Temperature when set .. Fahr.	98	88	98	88
Per cent. of butter fat in skim milk	0·48	0·96	0·65	1·20
Highest per cent. of butter fat in skim milk	0·9	1·2	0·9	1·8
Lowest per cent. of butter fat in skim milk	0·4	0·75	0·4	0·7
Setting period in hours	22	21	22	21
Quantity of fat in whole milk .. lbs.	1·23	1·23	1·37	1·37
" " left in skim milk "	0·139	0·278	0·188	0·348
Percentage unrecovered	11·31	22·63	13·76	25·40

This experiment shows that the loss of unrecovered butter-fat—which was left in the skim-milk—was 11·48 per cent. greater, when the setting of milk in deep-setting pails in ice water was delayed one hour, than it was when the milk was set immediately."

The work from which the above quotation is taken consists of 190 pages of most valuable information, much of which is the result of investigations conducted to discover how best to feed cows, and from the milk thus obtained how to produce the best butter and cheese, to compete on the English markets.

It is this combination of science and practice, which is so strong abroad, that the English farmer has to compete against, and he can only do so by a like combination of science and practice on his part.

The Fat Globules.—There still appears to be considerable lack of knowledge as to the nature of the fat globules in milk. The most extravagant development to which the old theory of these globules having a skin or envelope has been carried, which, if it were not so serious, would be the most amusing, is contained in No. 5. Here we read: "These fats exist in the form of globules." "Each is covered by a thin envelope of casein," and a drawing is given of these fat globules, each of which shows a distinct outer circle or coat. Now it is quite impossible under the microscope to see anything at all similar to this drawing, and we doubt whether the author ever saw a fat globule under the microscope, or he would never have allowed this figure to appear. Moreover, it is universally admitted that there is no proof of the fat globules having an envelope. Starting with this erroneous assumption, others naturally follow. Thus the reason why the small fat globules do not rise so rapidly as the large ones is "mainly because they vary in size, and in the proportion of casein forming the envelope, to the fat contained in it." This certainly is a novel explanation of a phenomenon which has usually been explained by the fact that being only slightly lighter than the liquid they float in they have not time to rise to the surface of the milk before the slowly but surely increasing viscosity of that liquid finally checks their upward tendency. An erroneous assumption having been made to start with, other erroneous deductions naturally follow; thus the ripening of cheese and the development of flavour is stated to be "probably brought about by a distinct ferment, which can only operate upon the fats when these are set free by the breaking down of their envelopes."

This uncertainty as to the nature of the fat globule is noticeable in other works. Thus in No. 6 we find the statement that "cream globules are surrounded by casein," but no attempt is made to state whether this means by an envelope of casein, which would be erroneous, or by casein in contact with the fatty globule. The majority of readers would understand it to mean an envelope of casein, and if the author referred to mere contact action, we think he ought further to have explained it.

The Ripening of Cream.—A subject which deserves far more attention than has hitherto been given to it, is the ripening of cream. First, we object to the method of testing the ripeness of cream commonly advised, viz. the use of litmus paper. It is, in our opinion, a very inadequate test. The object of ripening is to get flavour, and a delicate palate is far better able to discover when ripeness has been obtained than a mere determination of acidity. Moreover, the acidity may be of the wrong

ind, and this appears to have been entirely overlooked. In ıct, the correct explanation of the phenomenon of "ripening" an only be given by one who has adequately studied bacteria, nd this can perhaps not be said of the majority of the above uthors.

There are organisms which require air to enable them to row, and others which cannot grow where there is air. Those vhich cause cream to become rancid or strong-smelling are of he latter variety. Hence if the cream be well stirred, and air vorked into it, these will not grow; but if cream be not stirred, hen the lactic acid organisms will consume all the air, or, nore correctly speaking, the oxygen, and enable the detrinental organisms to grow and spoil the flavour of the cream ınd consequently of the butter. This is the object of stirring he cream, and not, as one author says, "to prevent a hard crust orming," though undoubtedly such a crust would enhance the nischief.

Germs, Ferments, or Bacteria.—Upon no subject are the statenents more remarkable than upon the nature and work of oacteria. A curious statement made by one author is, "that he duration of their life is thirty-six hours." How long one single organism can live would be difficult to prove. Before it were dead, however, it would have given birth to many, and these to hundreds more, before the end of thirty-six hours. Bacteria can be kept for several months, and still some be found ılive and ready to start active growth if placed in fresh food.

It is a serious matter when the few words regarding ferments ıre not only wrong, but are accompanied with drawings (as in No. 5) as erroneous as that of the fat globules in the same work. Thus the ferment which produces lactic acid, erroneously styled by the author the "sugar ferment," is illustrated as consisting of chains of round organisms, which are known to students of bacteria as strepto-cocci. It is true that such may be found in ropy milk, and are probably the cause of ropiness, but they are not the cause of the souring of milk. The author also says the casein is attacked by another organism, which may be named the "casein ferment." The drawing appears to be an attempt to represent the butyric acid organism.

It is impossible to rise from a perusal of this work (No. 5) without the thought that the practical maker of good cheese or good butter had far better remain in ignorance of principles than have such mistaken notions as those we have drawn attention to.

If we want more accurate information upon bacteria, we have to seek it in the work of our competitors (No. 7). A most interesting and valuable paper this is; and though we do not

entirely agree with all the details of statement therein, we would commend it to the notice of those engaged in dairy teaching.

The works upon Butter-making (Nos. 8, 9, and 10), and also those parts which deal with butter-making in the works already mentioned, contain far fewer errors than are made in connection with milk and cheese. Yet even with regard to butter strange statements sometimes appear. Thus one author asserts that "butter should contain no casein at all." We should like to see that butter. Most makers may be content if they can make butter with less than 1 per cent. of casein.

We have selected a few typical errors which occur in these writings on dairy matters, not with the object of depreciating the works, but rather to show those who are interested in the progress of dairy education the necessity which exists for further study. We would urge upon all teachers careful discrimination before they disseminate views, the truth of which they themselves have not the power of testing.

3.—*Manual of Dairy Work.* By JAMES MUIR. London. Macmillan & Co.

THIS "Primer" of Dairy Instruction reached us too late to be included among those previously noticed. It is far freer from error than any small work we have yet met with. There are a few slight errors, and a little carelessness in the arrangement of some details, as, for example, the conditions which influence the composition of milk (p. 10).

"The following are the chief conditions," the author says, which affect "the constitution of milk." We will re-arrange these without adding to them, and place opposite each the order the author gives it:—

These we should place first, because they affect all breeds.	7. The character of the season. 8. The time of year. 6. The food, and its suitability for its purpose, and for the animal.
	2. The breed of the animal.
True of all individuals of any breed.	9. Whether the evening or the morning milk. 10. Whether drawn at the beginning or end of milking. 5. The time that has elapsed since calving.
	1. The individual character of the animal. 3. Its age. 4. Its health.

Nevertheless this very table of conditions shows how ıoroughly the author has treated his subject, considering the ınall limit of space allowed him.

It is generally assumed by all people that the "skin" which ›rms upon the top of boiled milk is coagulated albumen. The uthor points out that it "is not albumen, but is part of the asein which has been altered by being heated in the air." He hen proceeds to state that, "curiously enough, it is found that ·here casein and albumen are together, as they are in milk, he latter is not curdled by boiling."

Now we venture to think that this is to the majority of eaders an entirely new supposition or statement, and we object o such statements being made without any proof, or means of ›roving it being given. The chief fault of nearly all manuals ›r guides to knowledge is the assumption on the part of the ıuthors that their dictum is to be accepted without question. All true scientific teaching first supplies facts that are, or may ›e, commonly observed or proved by experiment, and then draws 'rom these facts the conclusions to which the reasoning faculty ›oints.

There is far too much taken for granted already, both by ›eachers and pupils. What is needed is to develop the faculties ›f observation, experiment, and reason.

Two more drawbacks to this work need pointing out. There .s no index, and the chapters are not subdivided. The sub- livision of chapters is a great help to students, and should there ›e a second edition called for, we would advise the author to :arefully study the remarkable "Introductory" Science Primer by Professor Huxley, as a model of what all such elementary works should be.

In spite of the few points we have mentioned, we heartily velcome this addition to Dairy Literature. We believe it will upply a long felt want.

:.—*Some Physical Properties of Soils.* By MILTON WHITNEY. Published by Authority of the Secretary of Agriculture, United States Department of Agriculture.

THE publications of the United States Department of Agriculture ıre some of the most interesting and valuable which reach us luring the year, and this one is eminently so.

In consists of 90 pages of very closely reasoned matter, :ontaining numerous and intricate tables and much detailed

description of scientific work. These, however, are not the points to which we wish to draw attention. There is an eminently practical side to the results of the years of study which this bulletin records, and it is this practical aspect which we will endeavour to describe.

If a piece of glass tubing, about $\frac{1}{8}$ in. in diameter, be held upright in water with one end dipping under the water, the level of the water will be the same inside and outside the tube. If now a similar piece of tube be heated in a blowpipe flame until quite soft, and then drawn out firmly and rapidly to about one yard in length, a very minute tube is formed, the bore of which is so small that a pin could not be placed therein. If the end of a foot of such fine tubing be now inserted in water, the water immediately rises in the tube far above the level of the water outside. The fine tube is called a capillary tube, and its power of drawing water up above the level is called capillary action. It is due to the attraction which the surface of the glass has for the water, and is hence spoken of as "surface tension" as well as capillary action. Starting with this well-known fact, and also the fact that the height to which water rises in any given capillary tube is always the same under the same conditions, Professor Whitney found that if the nature of the water were changed—by dissolving salt in it, for example—the height to which it would rise in the tube was likewise affected. The surface tension of such a liquid was different to that of pure water. In every soil there are particles so minute that the spaces between them are even finer than the capillary tubes just referred to. Hence in every soil this "surface tension," or, as we in England usually term it, "capillary action," is always taking place. And evidently it is greater in finely divided soils than in those of coarse structure. It is this property, by which the subsoil water is continually drawn to the surface, that keeps soils moist in dry weather, and this also explains why gravelly and light soils are generally most liable to drought.

A large number of experiments were made by Professor Whitney to determine how far this property was affected by different materials *likely to be present in a soil.* Also whether the water in different soils had different degrees of "surface tension." It was found that they had, and the deduction which the author comes to, may be quoted in his own words:—

> "It has frequently been observed that an application of magnesium chloride, salt, or muriate of potash, tends to keep the soil more moist in dry weather. These substances have the highest surface tension of any in the table. They

would tend to increase the surface tension of the soil moisture, and increase the power the soil has of drawing water up from below, and it is probably this which explains the action of these salts referred to."

Now, are we acquainted with any facts which support this pposition? The readers of the 'Journal' are aware that r. William Ashcroft, one of the members of the Council, has ınd salt highly beneficial to barley. Yet there is no chemical planation of this fact. We cannot look upon the salt as a ɔd for the barley. Yet we know his land is high and a light il, liable to be easily dried and deficient in moisture. It ɔuld appear then not improbable that the salt, by altering the rface tension of the liquid in the soil, enables it to rise much gher, and to keep the land more moist than it would be had no lt been applied.

The results to which these experiments lead the author are ırtling. While we do not accept all his conclusions, yet we ink that some extracts from his work may be interesting to ır readers, and may give rise to more thought and study than e are usually inclined to devote to the mechanical as opposed the chemical nature of soils. We will take some extracts, ɔt in the order in which they occur, but without attempting to in them together by any comments of our own, more than ay be absolutely necessary.

Thus, again referring to the experiments upon surface tension, ıe author found that the soil moisture was of especially low ·nsion, and he says:—

"There is a very interesting application of this low surface tension of soil moisture. It is a matter of very common experience with gardeners that if a plant or piece of lawn is watered in a very dry season, by applying water to the surface of the ground, the watering has to be continued thereafter during all the dry season, as the result of a single watering is to leave the ground drier than it would otherwise have been. They usually put off watering as long as possible for this reason, and when they once begin they continue it. King has proved this experimentally by watering a piece of ground and letting it stand for twenty-four hours. He then found by direct determinations that the upper foot was wetter than immediately before the watering, but that the lower depths of the soil, down to 36 inches deep, were drier than before the watering. It would seem in this case that the higher surface tension of the pure water, or of the more dilute soil moisture in the surface soil, had pulled up water from below, where the

surface tension is less, and the danger would be that this water being brought near the surface would then evaporate quickly, and so more of the original soil moisture would be lost by evaporation than if the water had not been applied to the surface.

"To sum up, it may be briefly stated that the surface tension, or lifting power of soil moisture, is much lower than that of pure water. Many of the common fertilizing materials increase this surface tension of the soil moisture, and increase the power the soil has of drawing water up from below in a dry season, or of drawing water to a plant to replace that which has been lost by evaporation or has been used up or transpired by the plant. On the other hand, many organic substances lower the surface tension, or pulling power, of water very considerably, and lessen the power the soil has of pulling water up from below to supply the loss due to evaporation, or what has been used by plants.

"This effect of fertilizing materials in changing the surface tension of a liquid, and thereby changing the force or power which moves water from place to place in the soil, is only a first effect, as the continued use of these fertilizing materials may change the texture of the soil itself, and the relation of the soil to the circulation of the water."

It is evident that the author considers the texture of the soil of considerable importance, and this is well gathered from the following extracts:—

"It has not been many years since it was generally believed that the chemical analysis of a soil would show what class of plants the soil is best adapted to produce and what elements of plant food are lacking in the soil for the best development of other crops. It was found, by a vast amount of work on the chemical composition of soils and plants, that all soils contain a large amount of plant food, while the relatively small amount removed by crops in a series of years can not be detected by chemical means, although, as the result of injudicious methods of culture during this period, the soil may deteriorate and the yield of crop fall below the limit of profitable cultivation. It was then believed, and it is still held, that only a small proportion of the plant food in the soil is in such a form as to be readily available to plants, and that this may readily revert to an insoluble or unavailable form if it is not quickly used up by plants.

"Various solvents have been suggested and tried to determine the amount of available plant food in the soil.

Plot experiments with manures and fertilizers have been carried out to ask of the soil the direct question, what amount of available plant food is needed in order to insure a maximum crop.

"Some rather anomalous facts have been shown in this work. A plant having a large amount of nitrogen, for example, in its composition, will not necessarily respond to a manuring with this particular ingredient, but will respond readily to a manuring of another substance, of which it uses only a relatively small amount; while other plants, containing a small amount of nitrogen in their composition, will respond readily when manured with this substance, even on the same land. This is supposed to be due to a difference in the feeding capacity of the plants. A plant which responds readily to a nitrogenous manuring one year may respond more readily to a phosphatic manuring on the same soil the next year, if the *season* is different. The standard fertilizing materials frequently give a lower yield of crop than is produced where nothing has been added to the soil; and, on the other hand, a very small addition of a fertilizer may increase the crop to an extent out of all proportion to the amount of plant food added to the soil. This is especially true of stable manure and lime.

"There has been no satisfactory interpretation, as yet, of much of the work which has been done on the chemical composition of soils and plants, and the results of plot experiments have, in most cases, been very conflicting and uncertain.

"The physical conditions of growth have been recognized as of importance, and of controlling importance in many cases, but their influence has hardly been considered in soil investigations.

"Temperature, of course, is a very important factor in plant development, and this alone determines the general distribution of many plants." Indeed, "Temperature is the controlling cause in crop production."

But of "local conditions, moisture seems to be far more important than heat, and the relation of the soil to moisture largely determines the relation of the soil to heat. However potent, therefore, the factor of temperature may be in the general distribution of crops, the relation of soils to moisture, or the amount of moisture they may maintain under existing meteorological conditions, is quite as important a factor in the local distribution and development of plants.

"It is proposed in this paper to show that the physical

properties of soils very largely determine the local distribution and development of plants, and to suggest methods for the study and expression of the physical properties and condition of the soil.

"The agricultural chemist has approached this subject through the study of the chemical composition of soils and plants, and has attempted to explain the distribution of plants through the minute differences in chemical composition or in the form of chemical combination of the ingredients in the soil. The practical farmer, on the other hand, can judge much more correctly of the condition of the land and what it is best fitted to produce, from the general appearance or physical texture and structure of the soil. It is a matter of common experience to him to judge from the texture and general appearance of the soil what crop it is best fitted to produce, and what general treatment should be pursued in the production of the desired crop. He knows that wheat cannot be economically produced on light sandy lands, under prevailing climatic conditions, and that no addition of mere plant food will cause a good wheat crop to be produced on such a soil without resorting to irrigation, where the water supply can be controlled, or without first changing the texture of the soil so as to make it more compact and more retentive of moisture, so that it can maintain a more abundant supply of water for the crop. It is a matter of the available water supply maintained by the soil rather than of the available plant food which determines this local distribution of plants."

If we can accept the doctrine laid down in the above paragraphs, it becomes evident that the mechanical analysis of the soil will have an importance which hitherto it has not had. Why? Professor Whitney gives the following answer:—

"The results of the mechanical analyses as usually given have little meaning, for there is little or no attempt at the interpretation of the results, and there is no expression of the results which can be used in forming a definite opinion of the character of the land.

"It is proposed to suggest here an interpretation of the mechanical analyses of soils which shall explain and define these visible signs upon which the practical farmer bases his judgment of the agricultural value and condition of the soil, and which can be used, in relative terms at least, in the expression of results of soil and plant investigations.

"It will be necessary first to discuss some of the fundamental principles upon which this interpretation is based,

and then to present problems with an application of the principles. The primary conceptions upon which this is based may be briefly stated as follows: the circulation of water in the soil is due to gravity, or the weight of water, acting with a constant force to pull the water downward, and *also* to surface tension or the contracting power of the free surface of water [water-air surface], which tends to move the water either up or down in any direction, according to circumstances. The ordinary manures and fertilizers change this surface tension, or pulling power, of water.

"There is a large amount of space between the grains in all soils, in which water may be held. The rate of movement of the water will depend upon how much space there is in the soil; upon how much this space is divided up, *i.e.*, upon how many grains there are per unit volume of soil; upon the arrangement of the grains of sand and clay; and upon how this skeleton structure is filled in and modified with organic matter.

"The arrangement of the grains, and consequently the texture or structure of the soil, may be changed through the effect of the ordinary manures and fertilizing materials."

Before, however, we come to the study of the mechanical alysis of soils, there is a phenomenon of very great importance ıich needs to be considered. We will give the Professor's ʼn words:—

"Muddy water may remain turbid for an indefinite time. If a trace of lime or salt be added to the water the grains of clay *flocculate*, that is, they come together in loose light flocks, like curdled milk, and settle quickly to the bottom, leaving the liquid above them clear. Ammonia and some other substances tend to prevent this and to keep the grains apart, or to push them apart if flocculation has already taken place.

"This matter of flocculation has a most important bearing on the arrangement of the soil grains, and the relation of the soil to water. It will be remembered that there is, on an average, about 50 per cent. by volume, of empty space within the soil. This empty space is divided up by a vast number of grains of sand and clay. If these grains are evenly distributed throughout the soil, so that the separate spaces between the grains are of nearly uniform size, water will move more slowly through the soil than if the grains of clay, through flocculation, adhered closely together and to the larger grains of sand, making some of the spaces larger and others exceedingly small.

"We have, then, this principle to work on in the improvement of soils. In a close, tight clay in which water moves slowly, the continued use of lime may cause flocculation; the grains of clay will move closer together, leaving larger spaces for the water to move through. This is undoubtedly the trouble in some clays, the grains are very evenly distributed and the flow of water is so extremely slow that the soil is practically impervious to water. In such a soil a rapidly growing plant might perish for lack of sufficient water supply, when it was shown by analysis that the soil contained a large amount of water. The movement of water would be so slow that the soil could not supply the plant with water rapidly enough for its need, and the plant would suffer for water as in a light sandy land.

"On the other hand, there are soils in which the clay is held so closely to the grains of sand as to give the soil the appearance and properties of a sandy soil, although there is as much clay present as there is in many of the distinctively 'clay' lands.

"We will speak of this matter more at length when we come to speak of the application of these principles to the improvement of soils."

Having come to the conclusion that the mechanical condition of a soil is of such vital importance to its fertility, the author's next step is to raise the old, uninterpretable, and useless method of mechanical analysis to an elaborate and highly scientific system, the principles of which can only be briefly stated. Starting with the soil, from which all particles above 2 mm. in diameter have been removed and calculated as stones, he separates the remainder into eight portions having approximately the following sizes, and to each of these portions he gives the following conventional names:—

SEPARATIONS.

No.	Diameter.	Conventional Name.
	mm.	
1	2–1	Gravel.
2	1–·5	Coarse sand.
3	·5–·25	Medium sand.
4	·25–·1	Fine sand.
5	·1–·05	Very fine sand.
6	·05–·01	Silt.
7	·01–·005	Fine silt.
8	·005–·0001	Clay.

* A "millimetre" (mm.) is about $\frac{1}{25}$th of an inch.

From these data and others, which are fully explained in his paper, he is able to determine by calculations the surface area of the particles, and the number which would be present in one gramme * of each separation.

A large number of mechanical analyses of Soils carried out upon this system are then given, and, as illustrating the results obtained, we quote the following selected from a number of "types":—

MECHANICAL ANALYSES OF SUBSOILS, SHOWING PERCENTAGE BY WEIGHT OF THE VARIOUS "SEPARATIONS" PRESENT.

Separations. Diameter.	Separations. Conventional Names.	284. Truck †	286. Tobacco.	280. Wheat.
mm.				
2-1	Fine gravel	1·34	1·36	0·00
1-·5	Coarse sand	8·24	2·13	0·42
·5-·25	Medium sand	34·77	7·78	1·81
·25-·1	Fine sand	19·94	16·57	8·59
·1-·05	Very fine sand	11·11	19·83	32·06
·05-·01	Silt	12·15	25·41	23·65
·01-·005	Fine silt	4·17	4·52	6·77
·005-·0001	Clay	7·45	17·95	22·85
	Total	99·17	95·55	95·85
	Organic matter, water, loss ..	0·83	4·45	4·15

No.	Soil.	Clay.	Surface Area.	Approximate number of Grains per gramme.
		per cent.	sq. cm.	
284	Truck..	7·45	971	3,266,000,000
286	Tobacco	17·95	2,102	8,258,000,000
280	Wheat..	22·85	2,602	10,358,000,000

It is quite impossible to point out the many deductions which Professor Whitney would make from the results he thus obtains. The original paper deserves to be very carefully studied and thought out. Our object has been merely to draw attention to it, and to show that it deserves to be well and widely considered. While we do not accept all the learned author's deductions, yet we have refrained from criticism, feeling that this outcome of seven years' labour is deserving of more careful consideration before any attempt at criticism would be justifiable.

* A "gramme" is about 15½ grains. † Market garden soils.

5.—*Note-Book of Agricultural Facts and Figures for Farmers and Farm Students.* By PRIMROSE McCONNELL, B.Sc. 4th Edition. London: Crosby Lockwood and Co.

IF there is one thing more certain than another with regard to agriculture, it is that at times the farmer needs accurate data and information to enable him to carry on his practice. The object of this book is to supply such data. It is clearly printed, and yet so condensed that the work may be carried in the farmer's pocket and referred to when he is at work on the farm, without his having to wait until he can get indoors for the information he seeks.

To commence with, we find valuable data by which the area of land, the contents of stacks, and the determinations of levels may be calculated. This is followed by a series of tables of weights and measures used at various places and for various purposes throughout the country. For instance, as is well known, in the sale of wheat there are a great many measures used at various places, and even the same measure does not always represent the same weight; thus the bushel at Birmingham weighs 62 lbs., and rises at different markets until at Monmouth we find a bushel weighs 80 lbs.

The next portion of the work is devoted to data connected with machinery, more especially to that machinery which is found on a farm, such as the plough, reaper, steam-engine, &c. Then follow tables showing how to calculate the number of slates or tiles, or of corrugated iron sheets, of roofing felt, or thatch, which would be required to cover a building of a given size, and other information relating to the buildings on a farm. Various operations in which labour is required are next considered, showing the amount of work which ought to be done either by man or horse, and the cost of such work. Draining receives attention under this heading.

Soils, manures, and crops are next treated. The tables upon these subjects are very complete, especially those showing the composition of the various manures used by the farmer, while concise and valuable information is given as to the best means of utilising these manures. The facts upon which this advice is based are tabulated, showing the actual yields which have been obtained by experiments in their application to various crops. The tables relating to crops—which include one on the identification of grasses by their leaves—show the various species of the different crops cultivated, the quantity of seed required for each, the period of sowing, and the different soils to which the plants are best suited. The insects injurious to crops, and the various

moulds or fungoid diseases are concisely, yet well described, also the weeds prevalent on various soils.

The subject of feeding, including the composition of the various foods, occupies some fifty pages; and is probably the most concise and yet the most complete set of tables on this subject which exists in any English work.

Dairying and live stock occupy the remainder of this admirable little work. In its 500 pages there is as much information as is contained in a shelf-full of ordinary text-books on agriculture, and we commend it to the notice, not merely of the practical farmer, but of the student.

6.—*Live Stock.* By JOHN WRIGHTSON.
Soils and Manures. By J. M. H. MUNRO, B.Sc. London: Cassell and Co.

THESE are two of Cassell's agricultural text-books; the first of the series, on "Farm Crops," was noticed in the 'Journal' last year. Of these the one on Live Stock appears hardly suitable for an elementary student, being devoted rather to the practical side of farming, which cannot be learnt from books, than to the principles which underlie practice, and the teaching of which is the true object of education.

Dr. Munro's work on soils and manures is good. Commencing with the germinating seed it passes on to consider the substances contained in the full-grown plant. This naturally leads to a consideration of the sources of plant food, and hence to the soil. The plant food contained in the soil, and the necessity of enriching it by manures, having been considered, the general principles which should guide the farmer in the application of manures are stated, and well illustrated by woodcuts showing the effect of various manures upon plants grown in pots containing sand with different manures added thereto. The value of water cultures is also pointed out. Finally, the various manures made on the farm, or bought by the farmer, and their effect both on the soil and on crops, are dealt with. We recommend this book to all those who are interested in technical education. If there is one subject more than another on which the farmer believes Science has helped him, it is this subject of artificial manures and their use. Hence there is in this subject less opposition to instruction, and greater willingness to learn, than probably in any other. It forms an admirable starting-point, therefore, for technical agricultural education in rural districts, and a clever teacher can lead on gradually to show his

pupils that there is also much to be learnt in relation to crops, and their application to feeding. We should like to see experiments on the growth of various plants in pots, and in water, started in every agricultural village, under the direction of a teacher capable of explaining the results obtained. This would lead to greater interest in experiments generally. Subsequently a few experimental plots might be started, and visited from time to time by the teacher and his pupils. We venture to think a short lecture delivered on the spot would attract as much attention, and prove of greater value, than the same lecture delivered in a room, and illustrated simply by diagrams.

7.—*Practical Fruit Culture.* By J. CHEAL, F.R.H.S. (Bell's Agricultural Series). London: G. Bell and Son.

SEVERAL of these little works have been noticed in past numbers of the 'Journal,' and this one maintains the reputation of the series. The key-note to the author's teaching is well stated by him in the following pithy sentence:—"Fruit must be *cultivated,* and not allowed simply to *grow.*" The first necessity of all profitable fruit-culture is a soil suitable for the fruit which is to be grown, for, as is well known, different fruits thrive best upon different soils. But there are also other considerations which the author points out as follows:—

> "In selecting the most suitable position, it is necessary to bear in mind what line of culture is desired, and what particular fruit or fruits are intended to be grown, and this will greatly help to determine the soil and locality. Some of the considerations that would help to settle this are, for instance, whether fruits are to be grown principally for dessert purposes, and to be gathered and sent to market from the orchard, or whether apples and pears are to be stored for winter use, or whether the fruit is to be grown for a factory. In each case different soils and situations might be selected. All these matters should receive careful consideration, and the ultimate *object* should be kept steadily in view in order to *start* right. Upon this point science is of the utmost value to cultivators. A correct analysis of the character and constituent parts of each particular variety of fruit indicates the nature of the soil required to sustain it; and, on the other hand, an analysis of the soil shows what kind of tree will thrive best upon it in its natural condition, and will also be found of the greatest

assistance in applying manures, enabling the cultivator to supply the ingredients that may be deficient in the soil."

Unfortunately very little attention has been paid in the past replenishing, by means of manure, those soils upon which it is grown with the substances which are annually carried ay in the crop. We are glad to see that the author is aware the folly of such neglect, and impresses upon his readers the :essity of a change in the following words :—

"Within the last few years considerable advance has been made in the knowledge of all that relates to the application and action of manures; and it is, we fear, too often a subject for regret, that cultivators of orchards suffer from diminished produce and depreciation of land, arising from a want of a due appreciation and application of those principles by the aid of which some other branches of agriculture and horticulture have of late years so much profited."

Considerable attention is being paid to this subject — the ınuring of fruit trees—by our competitors abroad, and the ›ner we in England follow their example the greater will our chance of diminishing the rapidly increasing importation fruit.

It is by the study of such works as this, that the fruit-›wer may best hope to retain at home some of the large ms spent annually in our large towns on the purchase of fruit.

8.—*Agricultural Chemistry.* By ALFRED SIBSON, F.C.S. London: Geo. Routledge & Sons.

IIS is a new edition of a book, the last edition of which pears to have been published in 1867. It has been revised, tended, and brought up to date by the author and A. E. bson, F.C.S. There is no doubt that an elementary book on ;ricultural Chemistry is one of the wants of the day, and is book seems to meet this want. It is written in a style at commends itself to those who most need such a work, .mely, those who have had no, or very little, instruction in emistry, and only wish to learn something about the chemistry agriculture. It is not like the little book on "The Chemistry Farming" by the Right Hon. Sir T. D. Acland, a book intended r farmers, but is more suitable for students. Nor does it

entrench upon the ground covered by the admirable work on the "Chemistry of the Farm" by Mr. R. Warrington, F.R.S., but it is an admirable introduction to this work, which, in our opinion, is far too difficult for any one who has not had some previous instruction in chemistry.

The more recent investigations in the domain of agricultural chemistry do not appear to have been overlooked, so far as it was possible to introduce them into a book of this description. Thus we find mentioned the value of superphosphate for preventing the escape of ammonia from manure heaps.

The book is unfortunately very weak in some points. Thus, in the analysis of foods, the mineral matter is given as "phosphates, &c.," while the sand is called insoluble matter, so that it does not appear, to any one unacquainted with the subject, that the mineral matter and fibre are also insoluble. It is to be regretted that agricultural chemists do not adopt a uniform method of stating the results of analyses. Farmers frequently complain that they cannot compare analyses, as these are not stated in similar terms.

The book is not altogether free from those errors which are so liable to creep into any popular exposition of science; such, for example, as the statement that potassium catches fire when thrown upon water, whereas it is the hydrogen, liberated by the potassium, which burns.

However, in spite of these drawbacks, we can recommend the book as a popular guide to agricultural chemistry.

9.—*Handbook for Farmers and Small Holders.* By JAMES LONG and other Experts. Edited by JOHN WATSON, F.L.S. London: Sampson Low, Marston and Co.

THERE is no preface to state the object of this work, and certainly, after reading it carefully, we are not certain what that object is. It is divided into two parts, the first of which is by Professor Long, and the second by various writers. Presumably the first part is intended for farmers, and the second for small holders. In such case we doubt whether the information in the first part is sufficiently precise to be of value to practical men. The papers in the second part vary greatly in quality. Those by A. W. Shaw on "Profitable Pig-keeping," and by Charles Whitehead upon "Profitable Fruit-culture," are excellent, and Professor Long's on "Poultry-keeping" is also a good article. We cannot say as much for the others. Thus W. J. May, in a

chapter on "Vegetable Culture," appears to have had in view the culture of vegetables merely for the consumption of those who cultivate them, and to have entirely overlooked the more important aspect of the subject—how the small holder may place his vegetables upon the market so as to make their culture profitable. Thus, what is the use of describing the growth of Jerusalem artichokes, if, as the author says, "these are of easy culture on almost any soil, and although *not often a saleable crop* are yet worth growing, especially if a pig or pigs are kept." We doubt also the advice contained in the following sentence as to carrots—"the long sorts are most profitable as they are the most showy in appearance."

We believe it is this very tendency to be guided by appearance rather than quality which is so detrimental to home producers of fruit, vegetables, and other commodities. The real difficulty which the small holder has to contend with is how to keep his land in good condition, he having no farmyard manure, and being ignorant of the application of artificial manures. But this subject does not appear to be noticed by the author of this article.

The book contains much valuable advice to those who will carefully peruse it, but we cannot look upon it as a model of what such a work should be, though we realise fully the necessity there is for putting advice before small holders which may enable them to cultivate their land with profit.

Works from Abroad.

We have received from the United States Department of Agriculture some of the publications which they have issued during the past year. One of these, by Professor Whitney, on "Some Physical Properties of Soils," we have noticed at length on a previous page (p. 289). We have also referred to another upon "Milk Fermentation" in a review of Works on Dairying, p. 282.

A third consists of a compilation which includes "All Analyses of American Feeding Stuffs which were accessible to the Compilers, with the exception of those which were so incomplete, or so obviously erroneous as to leave no doubt as to the propriety of excluding them." Each table also gives the maximum, minimum, and average composition of the various analyses recorded. What is the object of such a compilation? We will answer, in the words of the compilers, "to supply data which might serve as a help and general guide in practical cattle feeding."

This work alone occupies 150 pages of closely printed tables, and is the most complete guide to the composition of agricultural products and feeding stuffs which exists in the English language, so far as we are aware. It indicates the determination of the American farmer to utilise in his practice all the assistance which science and accurate information afford, and shows us how necessary it is, if we are to compete with America, that we should follow this example, and that our Board of Agriculture should disseminate such valuable information and advice as are supplied by the Department of Agriculture to the farmers in the United States.

But they are not content merely with compiling and reproducing information already published elsewhere. Another pamphlet which has reached us, "Experiment Station Record," shows the work which is being done at the various experiment stations to further their knowledge in every department of agriculture. It is a record of excellent work, and its value is enhanced by showing at the same time the principal results which have been obtained from foreign investigations made during the same period.

It is impossible to study these reports without feeling that the problem of competition will become more serious every year.

ßath and West and Southern Counties Society.

SWANSEA MEETING, 1892.

JUDGES.

HORSES.

ʼicultural.—T. CHAPMAN, Orchard Portman, Taunton; F. STREET, ʒham Park, St. Ives, Hunts.

nters, Hacks, Ponies, and Harness.—E. KNOTT, The Grange, · Compton; C. SPICER, Bishop's Caundle, Sherborne.

CATTLE.

ron.—W. LEVERTON, Woolleigh Barton, Beaford, N. Devon; J. D. r, Pratshayes, Exmouth.

ırthorn.—G. GARNE, Burford, Oxon; J. HOW, Broughton, Huntingdon.

reford.—F. EVANS, Bredwardine, Hereford; T. C. SAUNDERS, Water-, Dorchester.

ısex.—R. HAMSHAR, Bolney, Sussex; A. STANFORD, Eatons, Steyning.

sey.—W. ASHCROFT, Layhams Farm, Hayes, Kent; A. T. MATTHEWS, ark, Lingfield, Surrey.

ernsey.—W. A. GLYNN, Seagrove, Sea View, near Ryde; J. W. MOSS, g, Kelvedon, Essex.

ck Welsh.—J. MARSH, Jun., Stackpole Home Farm, Pembroke, S. ; R. B. SMITH, Tynewydd, Bangor, N. Wales.

DAIRY AND BUTTER TEST.

[. MATTHEWS, The Park, Lingfield, Surrey.

SHEEP.

cester, Cotswold, Devon, and other Long-Woolled.—R. GARNE, orth, Northleach; F. YEANDLE, Runnington, Wellington, Somerset.

thdown, Hampshire Down, and other Short-Woolled.— FRIEND, Broughton, Stockbridge; A. HEASMAN, Court Wick, Little-on.

opshire, Oxford Down, Horned, and Mountain.—W. ELLIOTT, ›ush, Galashiels; P. A. EVANS, Sherlowe, Wellington, Salop.

INSPECTORS OF SHEARING.

ʼ. ALLEN, Belle Vue, Evercreech, Bath; H. MAYO, 4, Temple Terrace, ɜster.

PIGS.

W. J. Henman, Caversham, Reading; J. Treadwell, Upper Winchenden, Aylesbury.

CHEESE, BUTTER, AND CREAM.

H. Underhill, 7, High Street, Oxford; J. Webb, Brookville, Kensington, London, W.

BUTTER WORKERS.

Prof. Carroll, Royal Albert Farm, Glasnevin, Dublin; T. Rigby, Sutton Weaver, near Warrington.

FLANNEL AND KNITTING.

Lady Llewelyn, Penllergare, Swansea; J. Colmer, Union Street, Bath.

POULTRY.

J. Dixon, North Park, Clayton, Bradford.

HORSE SHOEING.

T. Aubrey, 19, The Paragon, Bath.

AWARDS OF PRIZES FOR STOCK, 1892.

** An animal designated in this list as the "reserve number" is entitled, ditionally, to succeed to any prize that may become vacant in its class by reason the animal placed above it by the Judges failing afterwards to qualify.

Animals, where not otherwise stated, may be considered to have been bred the Exhibitor.

ABBREVIATIONS EXPLAINED:—S., sire; d., dam; s. of d., sire of dam; y., year; , month; w., week; d., day; R., Reserve; V.H.C., Very Highly Commended; C., Highly Commended; C., Commended.

All ages calculated to June 1, 1892.

HORSES.

FOR AGRICULTURAL PURPOSES.

CLASS 1.—*Stallion, foaled before* 1890. [3 entries.]

I. (£20.)—J. A. BARRS, Stud Farm, Nailstone, near Hinckley, bay Shire, **ailstone Challenger** (13378), 3 y.; bred by Mrs. Anius, Bagworth, icester; s., Big Ben (3459); d., Smiler; s. of d., Simon Pure (2018).

II. (£10.)—J. BAZLEY, Bush House, Leominster, brown Shire, **Hercules** 53), 9 y., 2 w., 3 d.; bred by E. Edwards, Day House Farm, Kingsland; Whittlesea Briton (2694); d., Smart; s. of d., Black Prince (3467).

III. (£5.)—LORD TREDEGAR, Tredegar Park, Newport, Mon., dark bay ire, **Moulton Conqueror** (6178), 6 y.; bred by P. A. Muntz, M.P., gby; s., Yeoman (4192); s. of d., William the Conqueror (2343).

ASS 2.*—*Agricultural Stallion travelling regularly in South Wales for the whole of the season of* 1892, *the property of a resident in South Wales.* [2 entries.]

I. (£10.)—MISS TALBOT, Margam Park, Port Talbot, bay Clydesdale, **llyallon** (9455), 2 y., 11 m., 3 w.; bred by W. Kay, Kincardine on rth; s., The Vicar (5204); d., Nancy of Teck (9809); s. of d., Corsewall 120).

II. (£6.)—EARL CAWDOR, Stackpole Court, Pembroke, brown Clydesdale, **ashwood Again**, 4 y., 9 m., 4 d.; bred by T. O'Malley, Woodlands, haney, Co. Dublin; s., Flashwood; d., Fanny; s. of d., Topsman.

CLASS 3.—*Agricultural Stallion, foaled in* 1890. [2 entries.]

I. (£20.)—J. A. BARRS, Stud Farm, Nailstone, near Hinckley, brown ire, **Nailstone Royal Stamp**, 2 y.; bred by F. Wollaston, Shenton ll, Nuneaton; s., Big Ben (3459), s. of d., Canute.

CLASS 4.—*Agricultural Colt, foaled in* 1891. [6 entries.]

I. (£10).—J. THOMAS, East Hook, Portfield Gate, Pembrokeshire, bay ydesdale, 1 y., 1 w.; bred by W. Brown, Hazlefield, Kirkcudbrightshire; Macgregor (1487); d., Rosie of Hazlefield (5988); s. of d., Young Pride of otland (1368).

* The Prizes in Class 2 were given by the Glamorganshire General Agricultural ciety.

II. (**£5.**)—MRS. S. LOVELUCK & SONS, Kenfig House, Port Talbot, iron grey Shire, 1 y., 1 m., 2 w., 1 d.; s., Trentside II. (8483); d., Virgin; s. of d., Prince Arthur.

CLASS 5.—*Agricultural Mare and Foal, or in-Foal.* [2 entries.]

I. (**£15.**)—VISCOUNT EMLYN, Golden Grove, Carmarthenshire, brown Clydesdale, **Bell,** 4 y., 11 m., 3 w., 5 d.; bred by A. McDonald, Balerno, N.B.; s., Obedience (2313); d., Maggie of Harlow (5574); s. of d., Abbey Prince II.; with foal by Clan McAlpine.

CLASS 6.*—*Agricultural Mare and Foal, or in-Foal; the property of a resident in South Wales.* [1 entry.]

I. (**£10.**)—EARL CAWDOR, Stackpole Court, Pembroke, bay Clydesdale, in foal, **Susan,** 3 y., 3 w.; s., Macbeth; d., Maid of the West; s. of d., Star of the West.

CLASS 7.—*Agricultural Filly, foaled in* 1889. [6 entries.]

I. (**£10.**)—LORD ROTHSCHILD, Tring Park, Herts, bay Shire, **Cresswell Diamond,** 3 y. about; s., Duke of Cambridge II. (3607); d., Bounce; s. of d., Samson IV. (2494).

II. (**£5.**)—J. WILLIAMS, Regilbury Park, Winford, Bristol, bay Shire, **Regilbury Flower** (647), 3 y., 6 d.; s., Mormon (2847); d., Brown (313); s. of d., Prince Imperial V. (13467).

III. (**£3**), and extra (**£10.**)*—J. WILLIAMS, Home Farm, Merthyr Mawr, Bridgend, dark bay, **Chance,** 3 y., 2 w.; bred by G. German, Atherstone, Leicestershire; s., Chancellor (4959); d., Bess; s. of d., Bold Turk (2726).

R.—J. BAZLEY, Bush House, Leominster, bay Shire, 3 y., 1 m., 1 w.; bred by J. Hall, Park Farm, Leominster; s., Hercules (4453); d., Bounce; s. of d., Chieftain (3551).

CLASS 8.—*Agricultural Filly, foaled in* 1890. [9 entries.]

I. (**£10**), and **R.** for extra.†—W. J. BUCKLEY, Penyfai, Llanelly, Carmarthenshire, chestnut Shire, **Blyth Marigold,** 2 y.; bred by W. Wilkinson, North Wheatley, Retford; s., Grove Robin (5924); d., Flower; s. of d., President Lincoln (1766).

II. (**£5.**)—J. WILLIAMS, The Home Farm, Merthyr Mawr, Bridgend, bay, **Honest Lady,** 2 y., 3 d.; s., Young Honest Tom (3148); d., Rugby (vol. vi.); s. of d., Sampson (1986).

III. (**£3.**)—D. EVANS, Rhoscellanfawr, Borth, Aberystwith, brown, **Cannock Agnes,** 1 y., 11 m., 2 w.; bred by J. Richards, Morton Hall, Oswestry; s., Carbon (3523); d., Sandy (vol. xii.), s. of d., Royal Sandy (3993).

R.—W. B. RODERICK, Fronhenlog, Llanelly, Carmarthenshire, bay Shire, **Novelty,** 2 y.; bred by J. Searby, Frith Bank, Boston, Lincolnshire; s., English Oak (2771); s. of d., Brown Champion (292).

---

* The Prize in Class 6 was given by the Glamorganshire General Agricultural Society.

† Given by the Swansea Local Committee for the best entry in Class 7 or 8, the property of a resident in South Wales.

HUNTERS.

ss 9.*—*Thoroughbred Stallion travelling regularly in South Wales for the whole of the season of* 1892, *the property of a resident in South Wales.* [2 entries.]

. (£10.)—W. Jones, Kittle Hill, Bishopstone, Swansea, bay, **Sarchedon,** , 6 d.; s., Sarchedon.

lass 10.—*Hunter Mare or Gelding, foaled in* 1888. [7 entries.]

. (£20) and Champion (£20).†—Mrs. C. T. Hoare, Bignell, Bicester, gelding, **Seakale,** 4 y., 2 m.; s., Soulongue; d., Seagull; s. of d., East st.

I. (£10.)—F. B. Wilkinson, Blyth Spital, Rotherham, bay gelding, **ardsman,** 4 y.; s., Conductor; s. of d., Baron Cavendish.

II. (£5.)—J. Anthony, Cilveithy Farm, Kidwelly, bay or brown gelding, **ton,** 4 y.; bred by D. George, Haverfordwest; s., Prince Craft; s. of d., e Trade.

t.—G. Thompson, Mouseley End House, Wroxall, Warwick, chestnut ling, **General Gordon,** 4 y., 2 m.; s., Regent (vol. xiv., p. 348), Nancy; s. of d., Struant.

ass 11.—*Hunter Filly or Gelding, foaled in* 1889. [11 entries.]

. (£15.)—W. R. H. Tyler, Rodhuish, Withycombe, Taunton, brown ling, **Paragon,** 2 y., 11 m., 3 w.; s., Old Buck; d., Ida; s. of d., Marsh on.

I. (£5.)—S. P. Budd, 8, Gay Street, Bath, grey filly, **Lady Scot,** 3 y.; l by J. Keynes, Blandford; s., Scotguard; d., Jane (193); s. of d., egar Hill.

II. (£3.)—J. T. Fisher, Denant, Haverfordwest, brown, **Brown lland,** 3 y., 2 m.; bred by Sir O. Scourfield, Williamstown, Haverfordt; s., McCalmont; s. of d., Amsterdam.

t.—F. B. Wilkinson, Blyth Spital, Rotherham, roan gelding, **Prime nister,** 3 y.; s., Salisbury.

lass 12.—*Hunter Filly or Gelding, foaled in* 1890. [9 entries.]

. (£15.)—F. B. Wilkinson, Blyth Spital, Rotherham, chestnut gelding, **ritan,** 2 y.; s., Fabius; d., Lady Cromwell.

I. (£5.)—Miss Powell, Maesgwynne, Whitland, South Wales, chestnut ling, **Roderick Dhu,** 2 y.; s., Snowdoun; d., Alice; s. of d., Christmas ol.

II. (£3.)—G. H. Hopkins, 40, Belle Vue Street, Swansea, bay gelding, **llyn,** 2 y.; s., Schurzo.

The Prizes in Class 9 were given by the Glamorganshire General Agricultural iety.

Given by Godfrey L. Clark, Esq., Talygarn House, Llantrissant, President the Glamorganshire General Agricultural Society, for the best entry in ss 10, 11, 12 or 13.

R.—MISS POWELL, brown gelding, **Hope,** 2 y.; bred by T. Walters, Plasnewydd, near Carmarthen; s., Snowdoun; d., Mistletoe; s. of d., Christmas Carol.

CLASS 13.—*Hunter Filly or Colt, foaled in* 1891. [9 entries.]

I. (£15.)—S. P. BUDD, 8, Gay Street, Bath, chestnut filly, **Lady Fife,** 1 y., 1 m.; s., Ruddigore; d., Duchess; s. of d., Goldfinch.

II. (£5.)—C. V. PRYSE RICE, Llwynybrain, Llandovery, South Wales, chestnut colt, **The Orphan,** 1 y., 1 m., 4 w., 2 d.; s., Ruddigore; d., Little Widow; s. of d., Huguenot.

III. (£3.)—E. RILEY, Great Marston, Risbury, Leominster, brown colt, **Marston Chief,** 1 y., 1 m.; s., Munchausen; d., Lady Merry Bird; s. of d., Horn Blower.

R.—H. J. DAVIES, Bremenda, Llanarthney, Carmarthenshire, bay filly, **Lady Menda,** 1 y., 1 m., 2 w., 1 d.; bred by T. Walters, Plasnewydd, St. Clears; s., Scherzo; d., Mistletoe; s. of d., Christmas Carol.

CLASS 14.—*Hunter Mare and Foal, or in-Foal.* [3 entries.]

I. (£25) and Gold Medal.*—F. B. WILKINSON, Blyth Spital, Rotherham, dark bay, **Better Still,** 9 y.; s., Bonus; s. of d., Cornerstone; with foal by Discord.

II. (£10.)—MISS POWELL, Maesgwynne, Whitland, South Wales, chestnut, **Alice,** aged; bred by the late W. R. H. Powell, M.P., Maesgwynne, Whitland; s., Christmas Carol; d., Mrs. Evans; s. of d., Chit-Chat; with foal by Lord Byron.

HACKS.

CLASS 15.—*Mare or Gelding, over* 14·2 *hands.* [6 entries.]

I. (£10.)—T. D. JOHN, Corporation Hotel, Cardiff, bay gelding, **Lord Windsor,** 5 y.; s., Confidence.

II. (£5.)—J. H. CLIFTON, Keynsham, Bristol, bay mare, **Duchess of York**; s., Royal Charley II; s. of d., Randolph.

III. (£3.)—W. J. BUCKLEY, Penyfai, Llanelly, grey gelding, **The Baby,** 6 y.; s., Lord Hastings; s. of d., Arthur.

R.—T. DAVIES, Abercwmboi Farm, Aberdare, 5 y., 2 m.; s., Zeikiel Home Spun; s. of d., Old Calabar.

CLASS 16.—*Mare or Gelding, not over* 14·2 *hands.* [2 entries.]

I. (£7.)—A. H. MILTON, Castleton House, Clifton, roan mare, **Lady Elsie,** 5 y.; s., Confidence (158).

II. (£3.)—J. POTTOW, Gordon Lodge, Tyndall's Park, Clifton, Bristol, dun gelding, **Lord Cardigan,** 8 y.; s., Fireaway III.

* A Gold Medal, or a Bronze Medal and 5*l.* at the option of the winner, was given by the Hunters' Improvement Society for the best Brood Mare in-Foal to, or having bred a foal to, a thoroughbred horse, provided such mare was a Prize-winner, or was Reserved, in Class 14, and had not previously won the Hunters' Improvement Society's Medal or Premium as a Brood Mare.

PONIES.

CLASS 17.—*Mare or Gelding, not over* 13 *hands.* [2 entries.]

I. (£7) and extra (£5).*—T. E. THOMAS, Trehale, Penycwm, R.S.O., Pembrokeshire, bay gelding, **Jack,** 4 y., 2 m.; bred by J. Jenkins, Brimestone Hall, Wolfscastle; s., Trotting Briton.

CLASS 18.—*Mare or Gelding, not over* 12 *hands.*

I. (£5.)—A. H. MILTON, Castleton House, Clifton, bay gelding, **Joey,** 2 y.; bred by — Westaway, Tavistock; s., Bantam; d., Queen of the Moor.

II. (£3.)—D. JENKINS, Glanywern, Talsarn, South Wales, cream, **Gwen,** 4 y., 2 w.; s., Express Lion; d., Ross; s. of d., Welsh Flyer.

HARNESS.

CLASS 19.—*Mare or Gelding, over* 14 *hands and not over* 15·2. [7 entries.]

I. (£10.)—T. D. JOHN, Corporation Hotel, Cardiff, light brown gelding, **Lord Bute,** 5 y.; s., Monarch; s. of d., Confidence.

II. (£5.)—T. D. JOHN, brown mare, **Queen of Action**; s., Old Oxford; s. of d., Randall.

III. (£3.)—S. ROBINSON, Wenvoe, near Cardiff, brown mare, **Sweetheart** (H.S.B., 866), 6 y., 1 m. about; bred by L. J. Shirley, Caira; s., Pomfret Wonder (1371); d., Winnie (996); s. of d., Prick Willow.

R.—A. JEPSON, Mwyndy, Llantrissant, roan mare, **Matchless,** 5 y.; s., Chevronel.

CLASS 20.—*Mare or Gelding, over* 13 *hands and not over* 14. [8 entries.]

I. (£10.)—BUTCHER & THOMAS, Bedminster Mews, Bristol, dun mare, **Valentine,** 4 y.

II. (£5.)—J. H. CLIFTON, Keynsham, near Bristol, bay gelding, **The Don.**

III. (£3.)—D. HOPKINS, 9, Carlton Terrace, Swansea, bay gelding, **Gamecock,** 6 y. about.

R.—W. B. RODERICK, Fronhenlog, Llanelly, chestnut gelding, **Bob.**

CLASS 21.—*Mare or Gelding. not over* 13 *hands.* [1 entry.]

I. (£7.)—A. H. MILTON, Castleton House, Clifton, bay gelding, **Bantam,** 5 y.

---

* Given by the Swansea Local Committee for best entry in Class 17 or 18, the property of a resident in S. Wales.

CATTLE.

DEVON.

CLASS 22.—*Devon Bull, calved in* 1888 *or* 1889. [5 entries.]

I. (£15.)—Sir W. WILLIAMS, Bart., Heanton, Barnstaple, Devon, **Pretty Middling,** 2 y., 7 m., 1 w., 6 d., bred by the late Viscount Falmouth, Tregothnan, Probus; s., Lord Wolseley; d., Quadrille; s. of d., Sirloin.

II. (£10.)—J. HOWSE, Stamborough, Washford, Taunton, **Lord Stamborough** (2630), 2 y., 5 m., 1 w., 1 d.; s., The Vicar (2156); d., Daisy 4th (5224); s. of d., Nelson (1413).

III. (£5.)—W. LETHBRIDGE, Wood, Okehampton, **Bravo Tempter 2nd** (2543), 3 y., 3 m., 2 w., bred by J. Tremayne, Sydenham, Lew Down; s. Bravo (1686); d., Temptress 7th (5000); s. of d., Duke of Flitton.

R. & C.—CULVERWELL BROS., Durleigh Farm, Bridgwater, **Donovan** (2577), 3 y., 5 m., 6 d., bred by J. Surridge, Colford Farm, Bishop's Lydeard; s., General Gordon (1974); d., Curly Norah (7159); s. of d., Fancy's Robin (1556).

CLASS 23.—*Devon Bull, calved in* 1890. [4 entries.]

I. (£15.)—J. F. R. MORRIS, Prixford House, Marwood, Barnstaple, **Country Gentleman** (2741), 2 y., 2 w., 5 d.; s., Primrose Duke (2296); d., Lady Mary; s. of d., Duke (1320).

II. (£10.)—Sir W. WILLIAMS, Bart., Heanton, Barnstaple, **Proper Model,** 2 y., 4 d.; s., Captain; d., Fairmaid.

III. (£5.)—J. C. WILLIAMS, Werrington Park, Launceston, **Teuton,** 2 y., 4 m., 1 w.; s., Marmaduke (2280); d., Temptress 17th (8685); s. of d., Lord Underwood (1794).

CLASS 24.—*Devon Bull, calved in* 1891. [3 entries.]

I. (£15.)—J. C. WILLIAMS, Werrington Park, Launceston, **Applecrop,** 1 y., 4 m., 3 w., 2 d.; s., Marmaduke (2280); d., Apple Blossom (7973); s. of d., Tempter (1851).

II. (£10.)—J. F. R. MORRIS, Marwood, Barnstaple, **Masterman** (3026), 1 y., 1 m., 2 w., 5 d., bred by the late W. H. Punchard, Totnes; s., Lord Wolseley (2063); d., Myrtle 23rd (9010); s. of d., Lord Currypool (1589).

III. (£3.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Roger** (3049), 1 y.; s., Tregothnan (2902); d., Cherry 9th (10458); s. of d., Tempter 2nd (2153).

CLASS 25.—*Devon Cow, in-Milk or in-Calf, calved before* 1889. [2 entries.]

I. (£15.)—J. HOWSE, Stamborough, Washford, Taunton, **Moss Rose 12th** (10444), 4 y., 2 m., 3 w., 6 d., bred by A. C. Skinner, Pound Farm, Bishop's Lydeard; s., Lord Currypool (1589); d., Moss Rose 4th (5533); s. of d., Duke of Farringdon (1323).

II. (£10.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Portrait 2nd** (10464), 4 y., 1 w.; s., Benedict (1504); d., Portrait (7112); s. of d., General Colley (1564).

CLASS 26.—*Devon Heifer, in-Milk or in-Calf, calved in* 1889. [1 entry.]

I. (£15.)—Sir W. WILLIAMS, Bart., Heanton, Barnstaple, **Fiction 2nd,** y., 3 w., 1 d.; s., Foreman 2nd; d., Fiction; s. of d., Duke of Flitton 17th.

CLASS 27.—*Devon Heifer, calved in* 1890. [4 entries.]

I. (£10.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Moss ose 15th** (11,757), 2 y., 1 m., 3 w., 6 d.; s., Tempter 2nd (2153); d., Moss ose 12th (9864); s. of d., Royal Sam (2122).

II. (£5.)—Sir W. WILLIAMS, Bart., Heanton, Barnstaple, Devon, **Flame th,** 2 y., 5 d.; s., Captain; d., Flame; s. of d., Duke of Flitton 7th.

III. (£3.)—J. HOWSE, Stamborough, Washford, Taunton, **Prolific 13th** 11,409), 1 y., 11 m., bred by J. Farthing, Currypool, near Bridgwater; s., aronet (1897); d., Prolific 2nd (6286).

R. & H. C.—E. J. STANLEY, M.P., **Picture 11th** (11,760), 1 y., 11 m., w.; s., Moss Rose's Colley (2093); d., Picture 4th (4818); s. of d., Jack 1128).

CLASS 28.—*Devon Heifer, calved in* 1891. [6 entries.]

I. (£10.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Princess Margaret** (12,461), 1 y., 1 m., 3 w., 1 d.; s., Baronet (1897); d., Princess)099); s. of d., General Colley (1564).

II. (£5.)—Sir W. WILLIAMS, Bart., Heanton, Barnstaple, **Daisy 7th,** y., 4 m.; s., Captain; d., Daisy 4th; s. of d., Sir Michael.

III. (£3.)—E. MUCKLOW, Whitstone Head, Holsworthy, N. Devon, **ady Ida,** 1 y., 4 m., 3 w., bred by the late W. H. Punchard, Bourton all, Totnes; s., Duke of Bourton (2581); d., Lady Jane (10,373); s. of d., hampion (1696).

R.—J. F. R. MORRIS, Prixford House, Marwood, Barnstaple, **Daisy 4th** 2,316), 1 y., 1 m., 1 d.; s., Primrose Duke (2296); d., Daisy; (10,336); of d., Duke (1320).

C.—J. HOWSE, Stamborough, Washford, Taunton, **Flower 27th** (12,389), y., 2 w., 1 d., bred by the late W. H. Punchard, Bourton Hall, Totnes; , Duke of Bourton (2581); d., Dahlia (8227); s. of d., Master Harry 802):—E. J. STANLEY, M.P., **Velveteen 6th** (12,463), 1 y., 2 m., 1 w., d.; s., Baronet (1897); d., Velveteen 4th (9104); s. of d., General Colley 564).

SHORTHORN.

CLASS 29.—*Shorthorn Bull, calved in* 1888 *or* 1889. [6 entries.]

I. (£15.)—H. T. COOKSON, Sturford Mead, Warminster, roan, **Judge of ssize** (59,163), 4 y., 1 m., 2 w., 5 d., bred by A. Cruickshank, Sittyton; s., tandard Bearer; d., Duchess of Glos'ter 21st; s. of d., Barmpton Prince 32,995).

II. (£10.)—J. HANDLEY, Green Head, Milnthorpe, Westmoreland, white, **uke of Fife** (58,805), 3 y., 1 m., 2 w., 2 d., bred by T. Todd, Lamdrigg, endal; s., Emperor (58,890); d., Honeysuckle; s. of d., Lord of Lune 13,550).

III. (£5.)—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorkire, roan, **Duncan Grey,** 2 y., 9 m., 3 w., bred by W. Scorsby, Knapton, illington, Yorkshire; s., Merryman 2nd (54,719); d., Red Rosette 3rd; of d., Blairmore (49,156).

R. & H. C.—Sir H. H. VIVIAN, Bart., M.P., Park-le-Breos, Penmaen Gower, roan, **Laughton Waterloo** (61,103), 4 y., 1 m., 2 d., bred by J. H. Caswell, Laughton; s., Heydon Duke 17th (53,002); d., Waterloo of York 3rd; s. of d., Duke of Leicester (43,112).

CLASS 30.—*Shorthorn Bull, calved in* 1890. [8 entries.]

I. (£15.)—C. W. BRIERLEY, Rosedale, Tenbury, Worcestershire, roan, **Stanley,** 2 y., 5 m., bred by A. Ritson, Michelthwaite, Wigton, Cumberland; s., Master of Teesdale (59,458); d., Lady 15th.

II. (£10.)—F. W. BOND, Wargrave Hill, Henley-on-Thames, roan, **Rosedale Farmer,** 1 y., 8 m., 2 w., 4 d., bred by C. W. Brierley, Rosedale, Tenbury; s. Bangle (58,406); d., May Carew (vol. xxxvi. p. 303); s. of d., Baronet (52,459).

III. (£5.)—J. HANDLEY, Green Head, Milnthorpe, Westmoreland, white, **Magnus,** 2 y., 2 m., 3 w., 1 d., bred by M. Graham, Redgaton, Perth; s., Dauntless (54,155); d., Mabel; s. of d., Balmoral (44,327).

R. & H. C.—J. JOHN, Pelcombe, Camrose, R.S.O., Haverfordwest, white, **Silver King,** 2 y., 1 m., 3 w., 3 d., bred by Mrs. M. Lewis, Clynfiew, Boncath; s., Royal Derwent 2nd (58,045); d., Mistress Nancy 2nd; s. of d., Strickland (55,110).

C.—T. PENRICE, Kilvrough, near Swansea, roan, **Valkan,** 2 y., 2 m., 1 d.; s., Cardiff Boy.

CLASS 31.—*Shorthorn Bull, calved in* 1891. [4 entries.]

I. (£15.)—J. HOWELL, Green Farm, near Cardiff, roan, **Royal Gwynne,** 1 y., 2 m., 2 w., 3 d.; s., Royal Butterfly Duke 2nd (56,434); d., Cymro Gwynne 3rd; s. of d., Heathfield (55,852).

II. (£10.)—Mrs. LEWIS, Clynfiew, Boncath, South Wales, roan, **Rasselas,** 1 y., 1 m., 4 d., bred by C. Morgan Richardson, Noyadd Wilym, Cardigan; s., Reformer (53,521); d., Content; s. of d., Best Man (44,418).

III. (£3.)—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, roan, **Royal Fern,** 1 y., 2 m., 3 w., 4 d.; s., Prince Magnus (56,333); d., Fern 7th; s. of d., Donald (52,725).

R. & H. C.—A. GIBBS, Tyntesfield, Flax Bourton, roan, **Japson,** 1 y., 2 m., 2 w., 4 d., bred by P. Jenkins, Upper Grange, Magor, Newport; s., Borderer (55,398); d., Lady Superior 2nd; s. of d., Grand Gwynne 11th (60,917).

CLASS 32.—*Shorthorn Cow, in-Milk or in-Calf, calved before* 1889. [3 entries.]

I. (£15.)—C. W. BRIERLEY, Rosedale, Tenbury, Worcestershire, red and white, **Softlaw Rose,** 6 y., 3 w., 1 d., bred by J. Scott, Softlaw, East Manies, Kelso, N.B.; s., Prince Charming (50,197); d., Fairnington Rose; s. of d., Mountain Prince (61,343).

II. (£10.)—C. W. BRIERLEY, roan, **Rosedale Minnie,** 4 y., 6 m., 2 w., 4 d.; s., Rosedale Emperor (54,939); d., Rosedale Nun; s. of d., Rosedale Oxford (48,597).

CLASS 33.—*Shorthorn Heifer, in-Milk or in-Calf, calved in* 1889. [3 entries.]

I. (£15.)—C. W. BRIERLEY, Rosedale, Tenbury, Worcestershire, roan, **Godiva Butterfly,** 2 y., 8 m., 2 d., bred by R. Thompson, Inglewood, Penrith; s., Beau Cumbrian (55,361); d., Gillian Butterfly; s. of d., Beau Benedict (42,769).

II. (**£10.**)—J. HOWELL, Green Farm, near Cardiff, red and little white, **Lilly,** 3 y., 1 m., 2 w.; s., Baron of Ely (56,678); d., Melody; s. of d., The Captain (40,766).

CLASS 34.—*Shorthorn Heifer, calved in* 1890. [10 entries.]

I. (**£10.**)—C. W. BRIERLEY, Rosedale, Tenbury, Worcestershire, roan, **Rosedale Cherry,** 2 y., 4 m., 2 w., 1 d.; s., Mario (51,713); d., Waterloo Cherry 13th; s. of d., Duke of Certainty (47,719).

II. (**£5.**)—C. W. BRIERLEY, roan, **Princess,** 2 y., 1 m., 3 w., 4 d., bred by B. H. Allen, Clifford Priory, Herefordshire, R.S.O.; s., Laughton Earl 7th (56,003); d., Pink; s. of d., Hayle (43,345).

III. (**£3.**)—LORD TREDEGAR, Tredegar Park, Newport, Mon., red, **Rose Leaf 6th,** 2 y., 1 m., 1 w., 2 d.; s., Prince Frogmore Pippin (54,835); d., Rose Leaf 4th (vol. xxxvi., p. 694); s. of d., Bellerophon (47,471).

R. & V. H. C.—MARQUIS OF BUTE, K.T., Home Farm, Cardiff, white, **Grateful,** 2 y., 4 m., 3 w., 2 d.; s., Lord Grandville; d., Miss Gertrude; s. of d., Grand Duke of Gloucester (36,721).

H. C.—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorks, roan, **Fern 8th,** 2 y., 4 m., 2 w., 3 d.; s., Prince Magnus (56,333); d., Fern 7th; s. of d., Donald (52,725):—R. STRATTON, The Duffryn, Newport, Mon., red, **Jubilee Gem,** 2 y., 1 m., 1 w., 4 d.; s., Medallion (56,175); d. Jubilee; s. of d., Victor (52,297):—LORD TREDEGAR, light roan, **Fanny 2nd,** 2 y., 3 m., 4 w.; s. Jupiter (57,508); d., Fanny (vol. xxxv. p. 618); s. of d., Bellerophon (47,471).

C.—MARQUIS OF BUTE, red, **Blanchett 3rd,** 2 y., 2 m., 3 w., 2 d.; s., Lord Grandville; d., Thorndale Blanche 3rd; s. of d., Erin Wild Duke (51,224):—LORD TREDEGAR, red, **Red Rose,** 2 y., 3 m., 2 d.; s., Prince Frogmore Pippin (54,835); d., Rose Leaf 3rd (vol. xxxv. p. 619); s. of d., Crowned Victor (36,408).

CLASS 35.—*Shorthorn Heifer, calved in* 1891. [13 entries.]

I. (**£10.**)—R. STRATTON, The Duffryn, Newport, Mon., roan, **Timbrel 23rd,** 1 y., 2 m., 5 d.; s., Medallion (56,175); d., Timbrel 12th; s. of d., Victor (52,297).

II. (**£5.**)—**C. W.** BRIERLEY, Rosedale, Tenbury, Worcestershire, roan, **Rosedale Minerva,** 10 m., 2 w., 4 d.; s., Harry Ingram (54,417); d., Rosedale Minnie; s. of d., Rosedale Emperor (54,939).

III. (**£3.**)—H. T. COOKSON, Sturford Mead, Warminster, roan, **Crest,** 1 y., 2 m. 2 w., 1 d., bred by A. Scott, Towie, Barclay, Aberdeenshire; s., Roan Robin (57,992); d., Monogram 30th; s. of d., Lord Lovel (48,213).

R. & H. C.—J. HOWELL, Green Farm, near Cardiff, roan, **Green Duchess,** 9 m., 3 w.; s., Duke of Barrington 31st (58,783); d., Sweet Briar 12th; s. of d., Lord Gifford 3rd (43,514).

H. C.—R. & G. HARRISON, Underpark, Lealholm, Grosmont, Yorks., roan, **Warfare,** 1 y., 4 m., 1 w., 4 d., bred by — Campbell, Kinellar, Aberdeenshire; s., First Consul (57,314); d., Roan Rosebud 1st; s. of d., Gravesend (46,461):—R. STRATTON, red, **Jubilant,** 1 y. 3 w., 4 d.; s., Medallion (56,175); d., Jubilee Gem: s. of d., Victor (52,297):—Sir H. H. VIVIAN, Bart., M.P., Park-le-Breos, Penmaen Gower, red and little white, **Grand Duchess —th,** 11 m., 1 w.; s., Waterloo-De-Breos 5th (61,976); d., Grand Duchess 62nd; s. of d., Grand Duke of Geneva 3rd (49,677).

C.—F. W. Bond, Wargrave Hill, Henley-on-Thames, roan, **Gertrude 2nd,** 1 y., 2 m., bred by B. H. Allen, Clifford Priory, Herefordshire; s., Rissington Prince (59,760); d., Gertrude (vol. xxxii. p. 211); s. of d., Hayle (43,345):—S. Baker, jun., Sea Stud Farm, Ilminster, roan and white, **Blushing Sid 2nd,** 1 y., 2 m., 2 w., 4 d., bred by C. M. Paull, Knott Oak, Ilminster; s., Warrior (58,288); d., Blushing Sid; s. of d., Lord Bletchingley (45,065).

HEREFORD.

Class 36.—*Hereford Bull, calved in* 1888 *or* 1889. [4 entries.]

I. (£15.)—J. H. Arkwright, Hampton Court, Leominster, **Spring Jack** (14,191), 4 y., 4 m., 4 w., 2 d.; s., Hilarity (8734); d., Lively 10th; (H.B., vol. xvii., p. 14); s. of d., Conjuror (5264).

II. (£10.)—W. H. Cooke, The Green, Shelsley Kings, Worcester, **Grove Wilton 4th** (13,846), 4 y., 2 m., 2 w., 6 d.; s., Grove Wilton 3rd (11,295); d., Leinthall Symmetry; s. of d., Downton Grand Duke (5878).

III. (£5.)—J. Price, Court House, Pembridge, Hereford, **Grove Wilton 2nd,** 4 y., 4 m., 1 w., 6 d.; bred by W. H. Cooke, The Green, Shelsley Kings, Worcester; s., Grove Wilton 3rd (11,295); d., Rosetta (vol. xix., p. 265); s. of d., Sir Frank (2762).

Class 37.—*Hereford Bull, calved in* 1890. [5 entries.]

I. (£15.)—A. E. Hughes, Wintercott, Leominster, **Albion** (15,027), 2 y., 4 m., 3 w., 6 d.; bred by N. F. Moore, Sutton, Hereford; s., Bruce (13,646); d., Milenda; s. of d., Recorder (7205).

II. (£10.)—H. W. Taylor, Showle Court, Ledbury, **Sainfoin,** 2 y., 3 m., 3 w., 3 d.; s., Admiral (12,797); d., Echo; s. of d., Franklin (6961).

III. (£5.)—J. Price, Court House, Pembridge, Hereford, **Prince of Wales,** 2 y., 2 m.; s., Pioneer (14,025); d., Pansy Blossom (vol. cxix., p. 576); s. of d., Garfield 4th (11,251).

C.—J. Edwards, Rhiwlas Farm, Titley, Herefordshire, **Lord Shaftesbury** (15,470), 2 y., 1 m., 3 w., 1 d.; s., Shaftesbury (11,676); d., Queen Mab (H.H.B., vol. xvii.); s. of d., Jumbo (7053).

Class 38.—*Hereford Bull, calved in* 1891. [10 entries.]

I. (£15.)—R. Keene, Llanvihangel Court, Rogiet, Chepstow, **Ruler,** 1 y., 4 m., 3 w., 4 d.; s., Pembridge (10,387); d., Blanche 2nd; s. of d., Return (6639).

II. (£10.)—H. W. Taylor, Showle Court, Ledbury, **Astrakhan,** 1 y., 3 m., 4 w., 2 d.; s., Cavalier (9682); d., Echo; s. of d., Franklin (6961).

III. (£3.)—Earl of Coventry, Croome Court, Severn Stoke, **Gorgantus,** 1 y., 4 m., 2 w., 4 d.; s., Royal Ruler (13,406); d., Gareavous; s. of d., Adonis (10,926).

R.—J. Price, Court House, Pembridge, Hereford, **Earl Percy,** 1 y., 4 m., 1 w., 4 d.; s., Pioneer (14,025); d., Edith (vol. xvi., p. 509); s. of d., Hotspur (7028).

C.—Earl of Coventry, **Tammany,** 1 y., 4 m., 2 w., 6 d.; s., Royal Ruler (13,406); d., Tamarind; s. of d., Rare Sovereign (10,499).

CLASS 39.—*Hereford Cow, in-Milk or in-Calf, calved before* 1889. [4 entries.]

I. (£15.)—R. D. CLEASBY, Penoyre, Brecon, **Dainty 3rd,** 8 y., 1 m., w., 3 d.; bred by J. Handley, Pontwillyum, Brecon; s., Cremorne 4th 6375).

II. (£10.)—E. FARR, Pipton, 3 Cocks, R.S.O., Breconshire, **Broady,** y., 2 m.; s., Royal Duke (9155); d., Browny; s. of d., Pillish (5500).

CLASS 40.—*Hereford Heifer, in-Milk or in-Calf, calved in* 1889. [5 entries.]

I. (£15.)—T. FENN, Stonebrook House, Ludlow, **Downton Hermia,** y., 2 m., 1 w.; s., Bourton (11,005); d., Hermia; s. of d., Defender (5866).

II. (£10.)—EARL OF COVENTRY, Croome Court, Severn Stoke, Worcestershire, **Golden Fleece,** 3 y., 4 m., 3 d.; s., Rare Sovereign (10,499); d., Golden Fortune; s. of d., Adelbert (8185).

III. (£3.)—T. FENN, **Fine Lady,** 2 y., 6 m., 2 d.; s., Bourton (11,005); d., Bit of Fashion; s. of d., Auctioneer (5194).

R.—W. H. GODWIN, The Ferns, Lugwardine, near Hereford, **Tabouret,** y., 3 m., 3 w., 6 d.; s., Maidstone (8875); d., Pretty Lass; s. of d., Monarch (7858).

CLASS 41.—*Hereford Heifer, calved in* 1890. [3 entries.]

I. (£10.)—R. GREEN, The Whittern, Kington, Herefordshire, **Perilla,** 2 y., 4 m., 3 w., 3 d.; s., Whittern Grove (10,843); d., Miss Perfection; s. of d., Lord Wilton (4740).

II. (£5.)—Col. BRIDGFORD, C.B., Kinnersley, Hereford, **Sybil,** 2 y., 4 m., 3 w., 1 d.; s., Torro (7313); d., Dairymaid; s. of d., Ruby.

R. & H. C.—T. FENN, Stonebrook House, Ludlow, **Evening Star,** 2 y., 2 m., 1 w., 5 d.; s., Bourton (11,005); d., Star; s. of d., Anxiety (5188).

CLASS 42.—*Hereford Heifer, calved in* 1891. [6 entries.]

I. (£10.)—J. CAVE, Wall End, Monkland, Leominster, **New Year's Gift,** 1 y., 5 m.; s., Stockton Wilton (8078); d., Winnie 2nd (xxiii.); s. of d., Comet (4449).

II. (£5.)—J. PRICE, Court House, Pembridge, Hereford, **Pink Posy,** 1 y., 4 m., 5 d.; s., Pioneer (14,025); d., Pearl (vol. xviii., p. 570); s. of d., Hardwick (5956).

III. (£3.)—Col. BRIDGFORD, C.B., Kinnersley, Hereford, **Princess 2nd,** 1 y., 1 m., 3 w., 5 d.; s., Byron (13,656); d., Peerless; s. of d., Torro (7313).

R. & H. C.—A. E. HUGHES, Wintercott, Leominster, **Lucinda 2nd,** 1 y., 3 m., 3 w., 5 d.; s., Prince Rudolph (14,056); d., Lucinda; s. of d., Adonis (10,926).

C.—EARL OF COVENTRY, Croome Court, Severn Stoke, Worcestershire, **Varnish 2nd,** 1 y., 3 w., 6 d.; s., Senator (14,896); d., Varnish; s. of d., Adelbert (8185).

SUSSEX.

CLASS 43.—*Sussex Bull, calved in* 1888 *or* 1889. [3 entries.]

I. (£15.)—C. T. LUCAS, Warnham Court, Horsham, **Lord Oxeye** (954), 3 y., 9 m., 1 w., 1 d.; bred by R. Whitehead, Paddockhurst. Worth, Sussex; s., Golddust 11th (677); d., Marguerite (4066); s. of d., Frankenstein 4th (540).

CLASS 44.—*Sussex Bull, calved in* 1890. [3 entries.]

I. (£15.)—EARL OF DERBY, Birtley, Witley, Surrey, **Lord Oxeye of Wantley** (1070), 1 y., 11 m., 1 w., 1 d.; s., Lord Oxeye (954); d., Wantley 2nd (4245); s. of d., Oxford 2nd (771).

II. (£10.)—J. GODMAN, Park Hatch, Godalming, Surrey, **Goldlink** (1099), 2 y., 3 m.; s., Gold (815); d., Noble Lady (2911); s. of d., Napoleon 3rd (396).

CLASS 45.—*Sussex Bull, calved in* 1891. [3 entries.]

I. (£15.)—J. S. HODGSON, Lythe Hill, Farm, Haslemere, Surrey, **Headley**, 1 y., 4 m., 1 w., 3 d.; s., Dog Daisy (1112); d., Young Emily 1st (3622); s. of d., Prince Alfred (555).

II. (£10.)—EARL OF DERBY, Birtley, Witley, Surrey, **Gladiator**, 1 y., 3 m., 2 w., 3 d.; s., Jubilee (826); d., Gladsome 3rd (4008); s. of d., Oxford 2nd (771).

III. (£3.)—J. GODMAN, Park Hatch, Godalming, **Lord Noble**, 1 y., 4 m., 1 w., 5 d.; s., Nobility (838); d., Noble Lady 1st (3077); s. of d., Napoleon 3rd (396).

CLASS 46.—*Sussex Cow, in-Milk or in-Calf, calved before* 1889. [1 entry.]

[NO AWARD.]

CLASS 47.—*Sussex Heifer, in-Milk or in-Calf, calved in* 1889. [3 entries.]

I. (£15.)—EARL OF DERBY, Birtley, Witley, Surrey, **Brawny** (4685), 3 y., 2 m., 3 w., 5 d.; bred by W. Wood, junr., Hassocks, Sussex; s., Fitzgerald 3rd (749); d., Briony 6th (3649); s. of d., Golding (597).

II. (£10.)—J. S. HODGSON, Lythe Hill Farm, Haslemere, Surrey, **Pride of the Family 11th**, 2 y., 7 m., 3 w., 4 d.; s., Silversmith (849); d., Pride of the Family 2nd (2469); s. of d., Young Hartley (444).

CLASS 48.—*Sussex Heifer, calved in* 1890. [5 entries.]

I. (£10.)—J. GODMAN, Park Hatch, Godalming, Surrey, **Comely 21st** (5071), 2 y., 3 m., 6 d.; s., Nobleman 3rd (906); d., Comely 10th (3684); s. of d., Goldboy (541).

II. (£5.)—J. GODMAN, **Comely 19th** (5070), 2 y., 4 m., 3 w., 1 d.; s., Nobleman (707); d., Comely 9th (3682); s. of d., Goldboy (541).

III. (£3.)—C. T. LUCAS, Warnham Court, Horsham, **Verity 3rd** (5187), 1 y., 11 m., 2 w. 1 d.; s., Golden Horn (754); d., Veritas (3852); s. of d., Goldstone (600).

R. & H. C.—C. T. LUCAS, **Cora** (5180), 2 y., 3 d.; s., Jubilee (826); d., ›ra (2828); s. of d., Baronet (382).

CLASS 49.—*Sussex Heifer, calved in* 1891. [2 entries.]

I. (£10.)—EARL OF DERBY, Birtley, Witley, Surrey, **Madge,** 1 y., 1 m., w., 5 d.; s., Frank (997); d., Mabel 3rd (3780); s. of d., Goldboy (541).

JERSEY.

CLASS 50.—*Jersey Bull, calved in* 1888 *or* 1889. [6 entries.]

I. (£15.)—G. E. SMART, Combe Hay Park, Bath, whole, **Jupiter** (F.R.), y., 1 m., 2 w., 5 d.; s., Jubilee (F.O.); d., Gladiola; s. of d., Lord :aughty (1770).

II. (£10.)—G. SIMPSON, Wray Park, Reigate, dark silver grey, **Bessie's [Ionopolist,** 3 y., 3 w., 4 d.; s., Monopolist (2685); d., Bessie (vol. iv., . 157); s. of d., Noble 2nd (1172).

III. (£5.)—LORD ROTHSCHILD, Tring Park, Herts, brown, **Albany,** 3 y., m., 3 w., 2 d., bred by F. Surcouf, St. Lawrence, Jersey; s., Fairplay .038); d., Petite Cousine (5037); s. of d., Baron Chief (246).

R. & H. C.—Mrs. J. BROGDEN, Iscoed, Ferryside, grey fawn, **Hend- ›rd,** 2 y., 7 m., 3 d., bred by J. H. Shore, Whatley House, Frome; s., Dog 'ox (2384); d., Pearline (vol. v., p. 583); s. of d., Jersey Knight (1707).

CLASS 51.—*Jersey Bull, calved in* 1890. [9 entries.]

I. (£15.)—EARL OF LONDESBOROUGH, Londesborough Park, Market Veighton, grey fawn, **Grouville's Dairyman,** 2 y., 2 w., 5 d.; bred by H. .. Blyth, Stansted, Essex; s., Grouville's Champion (3346); d., Dairymaid nd (vol. v., p. 280); s. of d., Rocket (1969).

II. (£10.)—J. BRUTTON, 7, Prince's Street, Yeovil, dark fawn, **Sunbeam,** y., 11 m., 3 w., 2 d.; s., Castor 2nd (3155); d., Sultannie 11th (J.H.B., 159); s. of d., Isleworth (2529).

III. (£5.)—J. BLYTH, Wood House, Stansted, Essex, grey, **Silver ›ea,** 2 y., 2 m., 2 w., 4 d., bred by E. J. Hubert, St. Owen's, Jersey; s., Iourier's King (J.H.B., 1115, P.S., H.C.); d., Duchess of St. Owen's J.H.B., 3085, P.S., H.C.).

R. & H. C.—LORD ROTHSCHILD, Tring Park, Herts, grey, **President,** y., 4 m., 1 w., 5 d., bred by E. Briard, St. Owen's, Jersey; s., Carnot 1142); d., Mysterious Girl (2953).

C.—J. BLYTH, grey, **Rosy's Process,** 2 y., 3 m., 2 w., 3 d., bred by . C. Hamon, St. John's, Jersey; s., Rosy's Wonder (J.H.B., 835); d., Process I.H.B., 4045, F.S.C.):—G. GREENALL, Walton Hall, Warrington, dark ıwn, **Zulu's Pride** (J.H.B., 1512, H.C.), 2 y., 3 m., 3 w., 4 d., bred by '. Malzard, St. Peter's, Jersey; s., Mourier's King (1115, J.H.B.); d., Zulu th (2964, J.H.B.); s. of d., Pollux (871, J.H.B.)—and LORD ROTHSCHILD, rey, **President Carnot,** 2 y., 4 m., 1 w., bred by J. Le Rossignol, St. relades, Jersey; s., Carnot (1142); d., Jim Bower's Girl (J.J.H.B., 3074).

CLASS 52.—*Jersey Bull, calved in* 1891. [22 entries.]

I. (£15.)—LORD ROTHSCHILD, Tring Park, Herts, bronze fawn, **Spots ›ad,** 1 y., 1 m., 3 w., 2 d.; s., Columbus; d., Spot; s. of d., Sir Garnet 105).

II. (**£10.**)—H. J. CORNISH, Thornford, Sherborne, Dorset, brown, **Bismarck,** 1 y., 4 m., 2 w., 3 d., bred by D. Auvergne, St. Owen's, Jersey; s., May Lad; d., Wyandotte (7393, J.H.B.).

III. (**£3.**)—J. R. CORBETT, More Place, Betchworth, Surrey, grey, **Harry,** 1 y., 1 m., 1 w., 6 d.; s., Franciscan; d., Harebell A; s. of d., Reti 2nd.

R. & V. H. C.—G. SIMPSON, Wray Park, Reigate, dark silver grey, **Milkman,** 9 m., 1 w. 5 d.; s., Bessie's Monopolist (3080); d., Milkgirl 3rd (vol. iv., p. 468).

V. H. C.—LORD ROTHSCHILD, fawn, **Flora's Lad,** 1 y., 1 m., 6 d.; s., Fan's Lad; d., Flora 6th; s. of d., Diomed.

H. C.—LORD H. F. H. PELHAM-CLINTON-HOPE, Home Farm, The Deepdene, Dorking, whole, **Bristol Milk,** 11 m., 3 w., 3 d.; s., Frivolous (E.J.H.B., 3298); d., Prome Girl (E.J.H.B., vol. v., p. 616); s. of d., Earl Cicero (1546):—G. GREENALL, Walton Hall, Warrington, brown, **Rosa's Fortescue 2nd** (J.H.B., 1686), 1 y., 4 m., 3 w., 6 d., bred by E. G. Renouf, St. Martin's, Jersey; s., Rosa's Fortescue (J.H.B., 1318); d., Chance Aster (J.H.B., 3540):—and LORD ROTHSCHILD, fawn, **Clelie's Lad,** 1 y., 3 m., 1 d.; s., Golden Lad; d., Lady Clelie; s. of d., Boscobel (404).

C.—J. BLYTH, Wood House, Stansted, Essex, grey, **Grouville's Glee,** 1 y., 3 m., 6 d., bred by H. A. Blyth, Stansted; s., Grouville's Champion (3346); d., Glee; s. of d., Grey Prince (348):—J. BLYTH, grey, **Golden Prince,** 1 y., 3 m., 1 w., 4 d., bred by J. Arthur, St. Mary's, Jersey; s., Golden Lad (3324); d., Clementine 2nd (J.H.B., 3037, P.S.H.C.):—MRS. J. BROGDEN, Iscoed, Ferryside, fawn, **Verona,** 11 m., 2 w., 2 d.; s., Chieftain (3172); d., May Queen (583, H.C., J.H.B.); s. of d., Victor (148, H.C., J.H.B.):—and H. J. CORNISH, Thornford, Sherborne, Dorset, grey, **Kitty's Prince,** 1 y., 3 m., 2 w., 4 d.; s., Kaiser's Prince (3420); d., Kitty; s. of d., Napier 2nd (1841).

CLASS 53.—*Jersey Cow, in-Milk or in-Calf, calved before* 1889. [29 entries.]

I. (**£15.**)—J. BLYTH, Wood House, Stansted, Essex, grey, **Gloire d'Or,** 11 y., bred by J. C. Hamon, St. John's, Jersey; d., Process (J.H.B., 4045, F.S.C.).

II. (**£10.**)—J. BRUTTON, 7, Prince's Street, Yeovil, brown, **Fairy Elf,** 5 y., 1 m., 2 w., 1 d., bred by P. D. P. Amy, Grouville, Jersey; s., Catillon (3157); d., Boulivot's Pride (vol. viii., 1249); s. of d., Count Cicero (J.H.B., 398).

III. (**£3.**)—LORD ROTHSCHILD, Tring Park, Herts, creamy fawn, **Spot,** 6 y., 2 m., 1 w., 6 d., bred by J. Le Moignan, St. John's, Jersey; s., Sir Garnet; d., Bremen (4063).

R. & H. C.—LORD ROTHSCHILD, fawn, **Lily Brown 3rd,** 6 y., 1 w., bred by — Arthur, St. Mary's, Jersey; s., Volunteer (J.H.B., 694, P.S.); d., Lily Brown (J.H.B., 420, P.S.).

H. C.—J. BLYTH, fawn and white, **Lady Safety,** 6 y., 4 m., 3 w., 1 d., bred by E. Vardon, St. Martin's, Jersey; s., Royal Khedive (2863); d., Safety (J.H.B., 2338):—J. BLYTH, grey, **Fancy's Daisy,** 5 y., 2 m., 5 d., bred by C. Mauger, St. John's, Jersey; s., Khiva (3427); d., Fancy (780, P.S.C.); s. of d., Carlo (1030):—J. BRUTTON, grey fawn, **Bayleaf 4th,** 6 y., 2 m., 3 w., bred by P. Arthur, St. Saviour's, Jersey; s., Wolseley (2165); d., Bayleaf (J.H.B., vol. v., 3557):—H. J. CORNISH, Thornford, Sherborne, Dorset, fawn, **Star 2nd,** 7 y., 1 m., 1 w., 4 d., bred by C. W.

olley, St. Lawrence, Jersey; s., Wolseley (2165); d., Star (623, J.H.B., .C.); s. of d., Try Me (260, J.H.B.):—and LORD ROTHSCHILD, grey, **gton 2nd,** 3 y., 11 m., 3 w., 3 d., bred by A. Gautier, St. Saviour's, Jersey; ount Wolseley (928); d., Wigton (7198, F.S.); s. of d., Sir Robert (P.S.,).

.—Mrs. J. BROGDEN, Iscoed, Ferryside, grey, **Butterstar,** 8 y., 3 m., ., 1 d.; s., Stonehenge (2078); d., Bennie (Imported):—G. GREENALL, lton Hall, Warrington, light fawn, **La Chasse's Fancy 3rd** (3052, ., J.H.B.), 4 y., 2 m., 4 w., 2 d., bred by C. Contanche, St. John's, sey; s., Lily's Prince (681, J.H.B.); d., La Chasse's Fancy (421, .B.):—and W. B. RODERICK, Fronheulog, Llanelly, fawn, **Granville y 2nd,** 5 y., 3 d., bred by J. Maunaury, St. Saviour's, Jersey; s., Sans r 5th (3776); d., Granville Lily (J.H.B., 1365); s. of d., Nestor (1850).

CLASS 54.—*Jersey Heifer, in-Milk or in-Calf, calved in* 1889. [10 entries.]

. (£15.)—LORD ROTHSCHILD, Tring Park, Herts, light fawn, **Meggie,** , 2 m., 1 w., 6 d., bred by P. Syvret, St. Peter's, Jersey; s., Maufant's lo; d., Citoyenne Jacqueline (4862, F.S.).

I. (£10.)—H. J. CORNISH, Thornford, Sherborne, Dorset, grey fawn, **dora,** 2 y., 11 m., 3 w., 4 d., bred by S. De La Haye, St. Helier's, sey; s., Marcus (3510); d., Lady Derby 2nd; s. of d., Boniface (2271).

II. (£3.)—H. J. CORNISH, grey, **Success,** 3 y., 1 w., 4 d.; s., Leonora's die (2601); d., Six Rues Belle 4th; s. of d., Queenie's Boy (2824).

. & H. C.—J. BRUTTON, 7, Prince's Street, Yeovil, fawn, **Cicero's wslip 5th,** 3 y., 3 w., 2 d., bred by T. Falla, St. John's, Jersey; s., anne's Favourite (J.H.B., 873); d., Cicero's Cowslip (J.H.B., 1105).

. C.—J. BLYTH, Wood House, Stansted, Essex, grey, **Perry Farm eetness,** 3 y., 3 m., 4 w., 1 d., bred by P. L. Brun, St. Laurence, Jersey; Volseley 3rd (J.H.B., 631);—and his grey, **Lady May 2nd,** 3 y., 2 m., ., 1 d., bred by J. O. De Gruchy, St. Mary's, Jersey; s., Rosy's Wonder I.B., 835); d., Lady May; s. of d., Careful Lad.

.—J. BRUTTON, fawn, **Hypatia,** 3 y., 3 m., 3 w., 1 d.; s., Sir Walter I.B., vol. x., 1022); d., Edissa's Pet (J.H.B., 2675); s. of d., Wolseley's e (2995).

CLASS 55.—*Jersey Heifer, calved in* 1890. [19 entries.]

(£10.)—J. R. CORBETT, More Place, Betchworth, Surrey, grey, **Star-er C,** 2 y., 1 w., 6 d.; s., Franciscan; d., Stargazer 4th; s. of d., Baron hworth.

. (£5.)—LORD ROTHSCHILD, Tring Park, Herts, mulberry, **Crocus,** , 1 m., 6 d.; s., Count Wolseley (928); d., Tulip; s. of d., Sultane's ourite (873).

I. (£3.)—FOWLER AND DE LA PERRELLE, Southampton, fawn, **May-** (J.H.B.), 2 y., 1 m., bred by J. Godeaux, Jersey; s., Jumper (1087, .B.); d., Catillons May (5968, J.H.B.).

. & V. H. C.—LORD ROTHSCHILD, fawn, **Belle,** 2 y., 1 m., 2 w., 3 d.; rial; d., Belle Victorine 3rd; s. of d., Potsdam.

. H. C.—J. BRUTTON, 7, Prince's Street, Yeovil, brown, **Mountain e,** 2 y., 1 m., 3 w., 1 d., bred by J. R. Le Sueur, St. Lawrence, Jersey; Sir William 2nd (J.H.B., 1145); d., Augusta (J.H.B., 1181):—and

FOWLER AND DE LA PERRELLE, fawn, **Carlo's Lily** (J.H.B.), 2 y., 5 m., bred by P. Mollet, Jersey; s., Carlo 3rd (817, J.H.B.); d., Lady Cicero (991, J.H.B.).

H. C.—EARL OF LONDESBOROUGH, Londesborough Park, Market Weighton, fawn, **Happy Girl**, 2 y., 4 m., 3 w., 5 d.; s., Marius (2650); d., Abigail (vol. v., p. 141); s. of d., Rainbow (1943).

C.—J. BRUTTON, brown, **Jealousy**, 2 y., 1 m., 3 w., 1 d., bred by J. T. Mitchell, St. Peter's, Jersey; s., Sir William 2nd (J.H.B., vol. x., 1145); d., Lily's Beauty (J.H.B., vol. x., 2468); s. of d., Butter-maker's Boy (J.H.B., vol. x., 462):—FOWLER AND DE LA PERRELLE, grey brown, **Violet of Grantz** (J.H.B.), 2 y., 3 m., bred by J. Pirouet, Jersey; s., Carnot (1142, J.H.B.); d., Canturide (6958, J.H.B.):—their grey, **Apothicaire 2nd** (J.H.B.), 2 y., 2 m., bred by F. Le Brocq, Jersey; s., Bill Boy (1175, J.H.B.); d., Apothicaire (3110, J.H.B.):—and their brown, **Syren 2nd** (J.H.B.), 2 y., 2 m., bred by E. Le Feuvree, Jersey; s., Champion (1212, J.H.B.); d., Syren (2025, J.H.B.).

CLASS 56.—*Jersey Heifer, calved in* 1891. [23 entries.]

I. (£10.)—J. R. CORBETT, More Place, Betchworth, Surrey, light fawn, **Jessica 2nd**, 1 y., 1 m., 6 d.; s., Franciscan; d., Jessica; s. of d., Cadi.

II. (£5.)—LORD ROTHSCHILD, Tring Park, Herts, fawn, **Golden Drop**, 9 m., 1 d.; s., Columbus; d., Goldworthy; s. of d., Lord Wolesley.

III. (£3.)—J. R. CORBETT, dark fawn, **Mab**, 1 y.; s., Franciscan; d., Mabel 2nd; s. of d., Baron Betchworth.

R. & V. H. C.—LORD ROTHSCHILD, grey and white, **Wigton 4th**, 1 y., 1 m., 3 w., 4 d.; s., Columbus; d., Wigton 2nd; s. of d., Count Wolesley (928).

V. H. C.—LORD ROTHSCHILD, fawn, **Lady of the Lake**, 8 m., 1 w., 5 d.; s., Columbus; d., Lady of Kent; s. of d., Lemon Rex (571).

H. C.—J. BLYTH, Wood House, Stansted, Essex, fawn, **Grouville's Clytie**, 1 y., 2 m., 4 d., bred by H. A. Blyth, Stansted; s., Grouville's Champion (3346); d., Clyde 2nd; s. of d., Rocket (1969):—and his fawn, **Grouville's Lilian**, 9 m., 1 w., 4 d.; s., Grouville's Champion (3346); d., Grozilia 4th; s. of d., Tiley's Prince (J.H.B., 681).

C.—LORD H. F. H. PELHAM-CLINTON-HOPE, Home Farm, The Deepdene, Dorking, fawn and white, **Winter Tale**, 1 y., 2 m., 3 d.; s., Franciscan (2449, E.J.H.B.); d., Blossom; s. of d., Golden King (955, H.C.):—H. J. CORNISH, Thornford, Sherborne, Dorset, fawn, **Bide-a-wee**, 1 y., 1 m., 4 w.; s., Kitty's Wonder; d., Braga's Darling; s. of d., Dairy King 2nd (2364):—EARL OF LONDESBOROUGH, Londesborough Park, Market Weighton, fawn, **Bacchante**, 9 m., 1 w., 3 d.; s., Bacchus (3036); d., Wild Agnes; s. of d., Nero-du-Coin (1849):—LORD ROTHSCHILD, grey and white, **Marigold**, 1 y., 4 w., 1 d.; s., Columbus; d., Tulip; s. of d., Sultane's Favourite:—and his fawn, **Brenda**, 9 m., 2 w., 3 d.; s., Pandora's Boy; d., Bella; s. of d., Standard (1056).

GUERNSEY.

CLASS 57.—*Guernsey Bull, calved in* 1888 *or* 1889. [1 entry.]

II. (£10.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Lord Worth**, 2 y., 9 m. 2 w.; s., Archibald (442, P.S., R.G.A.S.); d., Beauty 3rd (1700, P.S., R.G.A.S.).

CLASS 58.—*Guernsey Bull, calved in* 1890. [6 entries.]

(£15.)—H. J. GIBBS, St. Ann's Lodge, Salisbury, lemon and white, **nie Bairn** (387, E.G.H.B.), 1 y., 6 m., 1 w., 5 d.; bred by Colonel leay, Glasshayes, Lyndhurst; s., Pepin 4th (263, E.G.H.B.); d., Braw 2nd (717, E.G.H.B.).

. (£10.)—L. U. JONES, Llandough Rectory, Cardiff, red and white, **ude 2nd,** 1 y., 10 m., 9 d.; bred by T. R. Thompson, Evwr Delyn, rth; s., Claude (298); d., Lady Lily Foley (1081).

I. (£5.)—Hon. Mrs. A. B. HAMILTON, Combs, Stowmarket, fawn and e, **Jessie 2nd,** 1 y., 9 m., 3 w., 3 d.; s., Loyalist (103, E.G.H.B.); essie 5th (582, E.G.H.B.); s. of d., First Lord (93, E.G.H.B.).

. & H. C.—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, Sussex, and white, **Sir Francis 2nd** (440, E.G.H.B.), 1 y., 10 m.; s., us (248); d., Laura 3rd (1094).

.—H. J. GIBBS, fawn and white, **Lord Milford** (412, E.G.H.B.), 8 m., 1 w., 3 d.; s., Squire Foley (369, E.G.H.B.); d., Lily de Candie , E.G.H.B.).

CLASS 59.—*Guernsey Bull, calved in* 1891. [6 entries.]

(£15.)—G. LONG, Ogbourne St. Andrew, Marlborough, fawn and white, **ole,** 1 y., 4 m., 3 w., 1 d.; s., Original (262, E.G.H.B.); d., Fan III.; d., Farmer's Pride.

. (£10.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, Sussex, and white, **Lord Worth 2nd,** 8 m.; s., Lord Worth (341); d., Laura (838).

I. (£3.)—H. J. GIBBS, St. Ann's Lodge, Salisbury, red and white, **Sir ph** (514, E.G.H.B.), 1 y., 3 m., 3 w., 2 d.; s., Oakley (565, R.G.A.S.); ady Annie (1922).

. & V. H. C.—H. J. GIBBS, red and white, **Harvester** (478, E.G.H.B.), , 2 m., 5 d.; bred by H. C. Stevens, M.P., Finchley, London; s., May (346, E.G.H.B.); d., Hebe (372, E.G.H.B.).

LASS 60.—*Guernsey Cow, in-Milk or in-Calf, calved before* 1889. [2 entries.]

(£15.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and e, **Fortuna** (758), 6 y., 1 m., 2 w.; bred by A. Rintoul, jun., Junior on Club, London; s., Hopeful (25); d., Blossom (21).

. (£10.)—Hon. Mrs. A. B. HAMILTON, Combs, Stowmarket, fawn and e, **Rosemary** (273, E.G.H.B.), 8 y., 3 m., 1 w., 5 d.; s., Loyal (37, H.B.); d., Marigold (Imported).

LASS 61.—*Guernsey Heifer, in-Milk or in-Calf, calved in* 1889. [2 entries.]

(£15.)—FOWLER and DE LA PERRELLE, Southampton, red and white, **nen 4th** (2940, G.H.B.), 2 y., 6 m.; bred by H. de Garis, Guernsey; rchibald (442, G.H.B.); d., Carmen 2nd (570, G.H.B.).

. (£10.)—FOWLER and DE LA PERRELLE, fawn and white, **Butter 1 5th** (4199, G.H.B.), 2 y., 9 m.; bred by N. Garet, Guernsey; s., Archer (G.H.B); d., Buttermaid.

CLASS 62.—*Guernsey Heifer, calved in* 1890. [1 entry.]

III. (£3.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Queen of the Isles 3rd** (1699), 2 y., 2 m.; s., Loftus (248); d., Queen of the Isles (663).

CLASS 63.—*Guernsey Heifer, calved in* 1891. [7 entries.]

I. (£10.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Queen of the Isles 4th,** 1 y., 3 m., 2 w.; s., Loftus (208); d., Queen of the Isles (663).

II. (£5.)—H. J. GIBBS, St. Ann's Lodge, Salisbury, red and white, **Lotta's Fancy** (1966, E.G.H.B.), 1 y., 3 m., 3 w., 5 d.; s., Squire Foley (369, E.G.H.B.); d., Lotta (613, E.G.H.B.).

III. (£3.)—G. LONG, Ogbourne St. Andrew, Marlborough, red and white, **Evelyn,** 7 m., 3 w., 6 d.; s., Ashplant (272, R.G.A.S.); d., Villagioise 2nd (838, P.S.).

R.—G. LONG, fawn and white, **Miss Ethel 3rd,** 1 y., 1 m., 2 w., 1 d.; s., Emin Pasha; d., Miss Ethel; s. of d., Baron Vauxbelets.

C.—Hon. Mrs. A. B. HAMILTON, Combs, Stowmarket, fawn, **Florence 4th,** 1 y., 2 m., 2 w., 5 d.; s., Sampson (269, E.G.H.B.); d., Florence (119, E.G.H.B.).

BLACK WELSH.*

CLASS 64.—*Black Welsh Bull, calved in* 1888 *or* 1889. [4 entries.]

I. (£10.)—W. E. OAKLEY, The Plas, Tan-y-Bwlch, Merionethshire, **Latimer,** 4 y., 2 m., 2 w., 5 d.; bred by Col. H. Platt, Gorddinog, Llanfairfechan, North Wales; s., Ap Gwilym; d., Blodwen; s. of d., Grand Duke.

II. (£5.)—E. EVANS, Maesmynach, Llanybyther, Carmarthen, **Roger,** 3 y., 11 m., 2 w., 3 d.; bred by Col. H. Platt; s., Molynog (vol. iii., 196, N.W.); d., Princess Joan (vol. ii., 347, N.W.); s. of d., Welsh Duke 3rd (59).

R. & H. C.—Lieut.-Col. LEACH, Corston, Pembrokeshire, **Sultan,** 3 y., 3 m., 2 w.; bred by Mrs. Williams, Love Lodge, Llandilo.

CLASS 65.—*Black Welsh Bull, calved in* 1890. [3 entries.]

I. (£10.)—T. E. THOMAS, Trehale, Penycwm, R.S.O., Pembrokeshire, **Sam,** 2 y., 2 m., 3 w., 1 d.; s., Jack; d., Sarah (vol. iv.).

II. (£5.)—O. WILLIAMS, Carne, Fishguard, **Black Prince,** 1 y., 6 m. 2 w., 3 d.; bred by J. Worthington, Glyn-y-Mel, Fishguard; s. of d., King.

R.—W. MORGAN, Pistyllgwyn, Llandilo, South Wales, **Ebrill,** 2 y., 1 m., 3 w.; s., J. Hughes; d., Night; s. of d., Henry.

CLASS 66.—*Black Welsh Bull, calved in* 1891. [4 entries.]

I. (£10.)—W. E. OAKLEY, The Plas, Tan-y-Bwlch, Merionethshire, **Ardudwy,** 1 y., 5 m.; s., Latimer; d., Netty.

II. (£5.)—R. M. GREAVES, Wern, Tremadoc, **Brenin Morfa,** 1 y., 4 m., 4 w., 1 d.; s., Ulundi; d., Mouwyn Morfa; s. of d., Einion.

* Given by the Swansea Local Committee.

L. C.—D. JENKINS, Glanywern, Talsarn, **Ap Gruffydd,** 16 m., ; bred by J. M. Griffiths, Penally Court, Tenby; s., Balfour (159); gham Gem 2nd (411).

'.—*Black Welsh Cow, in-Milk or in-Calf, calved before* 1889. [6 entries.]

ι.)—W. E. OAKLEY, The Plas, Tan-y-Bwlch, Merionethshire, y., 4 m., 4 w., 2 d.; d., Netty.

.)—R. M. GREAVES, Wern, Tremadoc, **Towyn 7th,** 4 y., 1 m., ; bred by Captain Best, R.N., Vivod, Llangollen; s., Sir Watkin ; d., Towyn.

3.)—J. M. GRIFFITHS, Penally Court, Penally, R.S.O.. **Rosal 6th,** , 3 w.; bred by The Earl of Cawdor, Stackpole Court; s., Young '); d., Rosal 2nd (249).

H. C.—H. DAVIES, Typicca, Golden Grove, **Queen,** 4 y. 5 m.; ; d., Victoria; s. of d., Egwod.

8.—*Black Welsh Heifer, in-Milk or in-Calf, calved in* 1889. [1 entry.]

).)—Major M. S. WYNNE, Mellaston, Pembroke, **Flirt,** 3 y., 2 m., Ulundi (150, S.W.B.C.H.B., vol. iv.); d., Belle 2nd (392, H.B., vol. iv.); s. of d., Dewi (148, S.W.B.C.H.B., vol. iv.).

s 69.—*Black Welsh Heifer, calved in* 1890. [2 entries.]

).)—W. E. OAKLEY, The Plas, Tan-y-Bwlch, Merionethshire, 1 y., 9 m., 2 w.; s., Latimer; d., Topsy; s. of d., Duke of

5.)—Major M. S. WYNNE, Mellaston, Pembroke, **Primrose,** ; s., Black Prince; d., Belle 2nd (392, S.W.B.C.H.B., vol. iv.,); ewi (148, S.W.B.C.H.B., vol. iv.).

s 70.—*Black Welsh Heifer, calved in* 1891. [3 entries.]

).)—W. E. OAKLEY, The Plas, Tan-y-Bwlch, Merionethshire, **Llan** y., 4 m., 4 w.; s., Latimer; d., Mair 3rd; s. of d., Harlech.

i.)—E. EVANS, Maesmynach, Llanybythor, **Duchess,** 11 m., 1 w.; Duke; d., Beauty; s. of d., Granellian.

H. C.—R. M. GREAVES, Wern, Tremadoc, **Wern Beauty,** , 4 w., 2 d.; s., Lord of the Isles (144); d., Tyndwfr 5th; s. of d., n Prince (106).

ANY BREED OR CROSS.*

ses 71 and 72 the quantity and quality of the milk and the date of last calving was taken into consideration.)

CLASS 71.—*Pair of Milking Cows.* [2 entries.]

)—Marquis of BUTE, K.T., Home Farm, Cardiff, roan and red ıs, **Quiver and Celestine,** 6 y.

ι by the Glamorganshire Agricultural Society, and competition was ɔ residents in South Wales.

II. (£5.)—H. W. LEAKER, Woodland Dairy, Swansea, light Shorthorns, **Daisy and Beauty**, 6 y., 1 m.; bred by C. Roberts, Senior Farm, near Ottery St. Mary.

CLASS 72.—*Any Breed or Cross-Breed Cow in-Milk.*
[NO ENTRY.]

BUTTER TEST PRIZES.*

(Animals entered in other Classes could also be entered in this Class.)

CLASS 73.—*Cow of any Breed or Cross, not exceeding* 1,100 *lbs. in weight, making the largest quantity of Butter, subject to a Butter Test by the Separator and Churn.* [19 entries.]

The Gold, Silver and Bronze Medals of the English Jersey Cattle Society were given, in addition, for the three Jerseys, eligible for the English Jersey Herd Book, competing in this test, making the best records.

I. (£25), and Gold Medal.—W. J. BUCKLEY, Penyfai, Llanelly, fawn Jersey, **Dame la Comte**, 5 y., 2 m., 4 w.; bred by C. Le Cornu, Jersey; s., Roseberry (2846); d., Maitresse Le Comte (J.H.B., 5567).

II. (Silver Medal).—Dr. H. WATNEY, Buckhold, Pangbourne, whole fawn Jersey, **Crane** (vol. iv., p. 236), 9 y., 8 m., 2 w.; bred by P. Dawncey, Horwood, Bucks; s., Thunderbolt (1261); d., Crayfish (vol. iii., p. 181); s. of d., Colonel (189).

III. (Bronze Medal).—J. BRUTTON, 7, Princes Street, Yeovil, brown Jersey, **Fairy Elf**, 5 y., 1 m., 2 w., 1 d.; bred by P. D. P. Amy, Grouville, Jersey; s., Catillon (3157); d., Boulivot's Pride (vol. viii., 1249); s. of d., Count Cicero (J.H.B., 398).

SHEEP.

LEICESTER.

CLASS 74.—*Leicester Shearling Ram.* [10 entries.]

I. (£10.)—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 1 y., 2 m., 2 w.

II. (£5.)—R. and G. HARRISON, 1 y., 2 m., 2 w.

III. (£2.)—R. and G. HARRISON, 1 y., 2 m., 2 w.

R. &. H. C.—Mrs. PERRY-HERRICK, Beau Manor Park, Loughborough, 1 y., 2 m., 2 w. about.

C.—W. LANXON, Demeuse, Lostwithiel, 1 y., 2 m., 1 w., 5 d.

CLASS 75.—*Pair of Leicester Ram Lambs, dropped in* 1892.
[6 entries.]

I. (£10.)—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 2 m., 2 w.

II. (£5.)—R. and G. HARRISON, 2 m., 2 w.

* Given by the English Jersey Cattle Society.

III. (£2.)—T. YELLAND, Nanphysick, St. Austell, Cornwall, 2 m., 2 w. about.

R.—Mrs. PERRY-HERRICK, Beau Manor Park, Loughborough, 2 m., 2 w., about.

CLASS 76.—*Pen of Three Leicester Shearling Ewes.* [4 entries.]

I. (£10.)—R. and G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 1 y., 2 m., 2 w.

II. (£5.)—R. and G. HARRISON, 1 y., 2 m., 2 w.

R. & C.—Mrs. PERRY-HERRICK, Beau Manor Park, Loughborough, 1 y., 2 m., 2 w. about.

COTSWOLD.

CLASS 77.—*Cotswold Shearling Ram.* [5 entries.]

I. (£10.)—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 1 y., 3 m., 2 w., 4 d.

II. (£5.)—G. BAGNALL and SON, Westwell, Burford, Oxon, 1 y., 4 m., 4 d.

R.—R. SWANWICK, 1 y., 3 m., 2 w., 4 d.

CLASS 78.—*Pair of Cotswold Ram Lambs, dropped in* 1892. [7 entries.]

I. (£10.)—W. THOMAS, The Hayes, Sully, Penarth, 3 m., 3 w. about.

II. (£5.)—T. R. HULBERT, North Cerney, Cirencester, 3 m., 3 w.

III. (£2.)—G. BAGNALL and SON, Westwell, Burford, Oxon, 3 m., 3 w., 3 d.

R. & H. C.—W. THOMAS, 3 m., 1 w. about.

CLASS 79.—*Pen of Three Cotswold Shearling Ewes.* [7 entries.]

I. (£10.)—G. BAGNALL and SON, Westwell, Burford, Oxon, 1 y., 4 m.

II. (£5.)—G. BAGNALL and SON, 1 y., 3 m., 3 w.

III. (£2.)—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 1 y., 3 m., 2 w., 4 d.

R. & C.—R. SWANWICK, 1 y., 3 m., 2 w., 4 d.

C.—G. BAGNALL and SON, 1 y., 4 m., 1 w.

DEVON LONG-WOOL.

CLASS 80.—*Devon Long-Wool Shearling Ram.* [13 entries.]

I. (£10.)—N. COOK, Chevithorne, Tiverton, Devon, 1 y., 3 m., 2 w.

II. (£5.)—Sir J. H. H. AMORY, Bart., Knightshayes Court, Tiverton, 1 y., 3 m., 2 w., 5 d.

III. (£2.)—N. COOK, 1 y., 3 m., 2 w.

R. & H. C.—C. G. THORNE, Curdon, Williton, Somerset, 1 y., 3 m., 2 w.

C.—Sir J. H. H. AMORY, Bart., 1 y., 4 m.:—and C. G. THORNE, 1 y., 3 m., 3 w.

CLASS 81.—*Pair of Devon Long-Wool Ram Lambs, dropped in* 1892.
[4 entries.]

I. **(£10.)**—N. COOK, Chevithorne, Tiverton, Devon, 3 m., 2 w.

II. **(£5.)**—N. COOK, 3 m., 2 w.

R. & C.—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, 4 m. about.

CLASS 82.—*Pen of Three Devon Long-wool Shearling Ewes.*
[4 entries.]

I. **(£10.)**—Sir J. H. H. AMORY, Bart., Knightshayes Court, Tiverton, Devon, 1 y., 3 m., 2 w., 5 d.

II. **(£5.)**—Sir J. H. H. AMORY, Bart., 1 y., 3 m., 3 w., 5 d.

R.—W. LANXON, Demeuse, Lostwithiel, 1 y., 2 m., 2 w.

OTHER LONG-WOOL BREEDS.

CLASS 83.—*Shearling Ram.*
[NO ENTRY.]

CLASS 84.—*Pair of Ram Lambs, dropped in* 1892.
[NO ENTRY.]

CLASS 85.—*Pen of Three Shearling Ewes.*
[NO ENTRY.]

SOUTHDOWN.

CLASS 86.—*Southdown Shearling Ram.* [16 entries.]

I. **(£10.)**—A. DE MURRIETA, Wadhurst Park, Wadhurst, 1 y., 3 m., 1 or 2 w. about.

II. **(£5.)**—Sir W. THROCKMORTON, Bart., Buckland, Faringdon, Berks, 1 y., 3 m., 1 w., 5 d.

III. **(£2.)**—J. BLYTH, Wood House, Stansted, Essex, 1 y., 3½ m.

R. & H. C.—E. ELLIS, Summersbury, Shalford, Guildford, 1 y., 3 m., 2 w.

C.—C. T. LUCAS, Warnham Court, Horsham, 1 y., 3 m., 2 w.:—and PAGHAM HARBOUR Co., Selsey, Chichester, 1 y., 3 m., 2 w.

CLASS 87.—*Pair of Southdown Ram Lambs, dropped in* 1892.
[9 entries.]

I. **(£10.)**—A. DE MURRIETTA, Wadhurst Park, Wadhurst, 3½ m.

II. **(£5.)**—PAGHAM HARBOUR Co., Selsey, Chichester, 4 m.

III. **(£2.)**—E. ELLIS, Shalford, Guildford, 3 m., 1 w., 3 d.

R. & H. C.—E. ELLIS, 3 m., 1 w., 3 d.

C.—J. BLYTH, Wood House, Stansted, Essex, 3½ m.:—and C. T. LUCAS, Warnham Court, Horsham, 3 m., 1 w.

CLASS 88.—*Pen of Three Southdown Shearling Ewes.* [11 entries.]

I. (£10.)—J. BLYTH, Wood House, Stansted, Essex, 1 y., 3½ m.

II. (£5.)—A. DE MURRIETTA, Wadhurst Park, Wadhurst, 1 y., 3 m., 1 or 2 w. about.

III. (£2.)—E. ELLIS, Shalford, Guildford, 1 y., 3 m., 2 w.

R. & H. C.—A. DE MURRIETTA, 1 y., 3 m., 1 or 2 w. about.

C.—C. T. LUCAS, Warnham Court, Horsham, 1 y., 3 m., 2 w.

HAMPSHIRE DOWN.

CLASS 89.—*Hampshire Down Shearling Ram.* [13 entries.]

I. (£10.)—W. NEWTON, Crowmarsh Battle, Wallingford, 1 y., 4 m., 2 w.

II. (£5.)—F. R. MOORE, Littlecott, Upavon, Wilts, 1 y., 4 m., 2 w.

III. (£2.)—J. BARTON, Hackwood Farm, Basingstoke, 1 y., 4 m., 2 w.

R. & H. C.—F. R. MOORE, 1 y., 4 m., 3 w.

C.—R. COLES, The Grange, Warminster, Wilts, 1 y., 4 m., 1 w. about:—for his 1 y., 4 m., 1 w. about:—and H. T. LEWIS, Westbury Park, Petersfield, Hants, 1 y., 3 m., 2 w.

CLASS 90.—*Pair of Hampshire Down Ram Lambs, dropped in* 1892. [9 entries.]

I. (£10.)—W. NEWTON, Crowmarsh Battle, Wallingford, 4 m., 2 w.

II. (£5.)—F. R. MOORE, Littlecott, Upavon, Wilts, 4 m., 2 w.

III. (£2.)—J. BARTON, Hackwood Farm, Basingstoke, 4 m., 2 w.

R. & H. C.—J. BARTON, 4 m., 2 w.

C.—R. COLES, The Grange, Warminster, Wilts, 4 m., 1 w. about.

CLASS 91.—*Pen of Three Hampshire Down Shearling Ewes.* [5 entries.]

I. (£10.)—H. T. LEWIS, Westbury Park, Petersfield, Hants, 1 y., 3 m., 2 w.

II. (£5.)—W. NEWTON, Crowmarsh Battle, Wallingford, 1 y., 4 m., 2 w.

R. & H. C.—W. NEWTON, 1 y., 4 m., 2 w.

SHROPSHIRE.

CLASS 92.*—*Shropshire Shearling Ram.* [44 entries.]

I. (£10.)—G. LEWIS, Ercall Park, Wellington, Salop, 1 y., 3 m., 1 w.

II. (£5.)—G. GRAHAM, The Oaklands, Birmingham, 1 y., 2 m., 3 w., 3 d.

III. (£3.)—W. F. INGE, Thorpe Hall, Tamworth, 1 y., 3 m. about.

* The third and fourth Prizes in Class 92 were given by the Shropshire Sheep Breeders' Association.

IV. (£2.)—A. S. BERRY, Pheasey Farm, Great Barr, Birmingham, 1 y., 3 m. about.

R. & V. H. C.—W. F. INGE, 1 y., 3 m. about.

H. C.—A. S. BERRY, 1 y., 3 m. about:—and for his 1 y., 3 m. about:—T. and S. BRADBURNE, Astwood Hill, Redditch, 1 y., 2 m., 3 w.:—G. GRAHAM, 1 y., 3 m., 2 w., 2 d.:—G. LEWIS, 1 y., 3 m.:—A. E. MANSELL, Harrington Hall, Shifnal, Salop, 1 y., 3 m.:—and G. THOMPSON, Mousley End House, Wroxall, Warwick, 1 y., 2 m., 2 w.

C.—J. HARDING, Norton House, Shifnal, Salop, 1 y., 3 m. nearly:—A. E. MANSELL, 1 y., 3 m.:—and for his 1 y., 3 m.:—J. PRICE, Barnsheath, Appleby, Atherstone, 1 y., 3 m. about.

CLASS 93.—*Pair of Shropshire Ram Lambs, dropped in* 1892. [17 entries.]

I. (£10.)—H. P. RYLAND, Ottisham Hall, Erdington, Birmingham, 3 m. about.

II. (£5.)—T. and S. BRADBURNE, Astwood Hill, Redditch, 3 m., 3 d.

III. (£2.)—EARL OF LISBURNE, Crosswood, Aberystwith, South Wales, 3 m., 2 w.

R. & V. H. C.—A. BRADBURNE, Hammerwich Place, Lichfield, 3 m., 2 w., 3 d.

H. C.—EARL OF LISBURNE, 4 m.:—A. E. MANSELL, Harrington Hall, Shifnal, Salop, 3 m., 2 w.:—and for his 3 m., 2 w.

C.—J. BOWEN-JONES, Ensdon House, Montford Bridge, Salop, 3 m. about:—W. F. INGE, Thorpe Hall, Tamworth, 3 m. about:—and J. PULLEY, Lower Eaton, Herefordshire.

CLASS 94.*—*Pen of Three Shropshire Shearling Ewes.* [20 entries.]

I. (£10.)—G. GRAHAM, The Oaklands, Birmingham, 1 y., 3 m., 2 d. about.

II. (£5.)—W. F. INGE, Thorpe Hall, Tamworth, 1 y., 3 m. about.

III. (£3.)—T. & S. BRADBURNE, Astwood Hill, Redditch, 1 y., 2 m., 3 w.

IV. (£2.)—A. S. BERRY, Pheasey Farm, Great Barr, Birmingham, 1 y., 3 m. about.

R. & V. H. C.—G. THOMPSON, Mousley End House, Wroxall, Warwick, 1 y., 3 m.

H. C.—G. LEWIS, Ercall Park, Wellington, Salop, 1 y., 3 m., 2 w. about:—and J. PRICE, Barnsheath, Appleby, Atherstone, 1 y., 3 m. about.

C.—J. BOWEN-JONES, Ensdon House, Montford Bridge, Shropshire, 1 y., 3 m. about:—and J. HOWELL, Green Farm, near Cardiff, 1 y., 3 m. about.

OXFORD DOWN.

CLASS 95.—*Oxford Down Shearling Ram.* [7 entries.]

I. (£10.)—A. BRASSEY, Heythrop Park, Chipping Norton, 1 y., 4 m., 2 w.

II. (£5.)—A. BRASSEY, 1 y., 4 m., 2 w.

* The third and fourth Prizes in Class 94 were given by the Shropshire Sheep Breeders' Association.

III. (**£2.**)—A. Brassey, 1 y., 4 m., 2 w.

R.—G. Adams, Royal Prize Farm, Pidnell, Faringdon, Berks, **Royal 1st,** 1 y., 4 m., 2 w.

Class 96.—*Pair of Oxford Down Ram Lambs, dropped in* 1892. [6 entries.]

I. (**£10.**)—A. Brassey, Heythrop Park, Chipping Norton, 4 m., 3 w.

II. (**£5.**)—A. Brassey, 4 m., 3 w.

III. (**£2.**)—G. Adams, Royal Prize Farm, Pidnell, Faringdon, Berks, 4 m., 2 w.

R. & C.—R. W. Hobbs, Kelmscott, Lechlade, 4 m., 1 w. about.

Class 97.—*Pen of Three Oxford Down Shearling Ewes.* [3 entries.]

I. (**£10.**)—A. Brassey, Heythrop Park, Chipping Norton, 1 y., 4 m., 2 w.

II. (**£5.**)—G. Adams, Royal Prize Farm, Pidnell, Faringdon, Berks, 1 y., 4 m., 2 w.

R. & H. C.—G. Adams, 1 y., 4 m., 2 w.

SOMERSET AND DORSET HORN.

Class 98.—*Somerset and Dorset Horn Shearling Ram.* [4 entries.]

I. (**£10.**)—Culverwell Brothers, Durleigh Farm, Bridgwater, **Young Sam,** 1 y., 6 m., 6 d.

II. (**£5.**)—J. Kidner, Nynehead, Wellington, Somerset, 1 y., 5 m., 2 w.

R. & H. C.—J. Kidner, 1 y., 5 m., 2 w.

Class 99.—*Pair of Somerset and Dorset Horn Ram Lambs, dropped after Dec. 1st,* 1891. [1 entry.]

I. (**£10.**)—Culverwell Bros., Durleigh Farm, Bridgwater, 6 m., 6 d.

Class 100.—*Pen of Three Somerset and Dorset Horn Shearling Ewes.* [4 entries.]

I. (**£10.**)—Culverwell Bros., Durleigh Farm, Bridgwater, 1 y., 6 m., 6 d.

II. (**£5.**)—J. Kidner, Nynehead, Wellington, Somerset, 1 y., 5 m., 2 w.

R. & V. H. C.—S. Kidner, Bickley, Milverton, Somerset, 1 y., 5 m., 2 w.

H. C.—J. Kidner, 1 y., 5 m., 2 w.

MOUNTAIN.

Class 101.—*Two-Shear or Shearling Mountain Ram.* [7 entries.]

I. (**£10.**)—E. J. Stanley, M.P., Quantock Lodge, Bridgwater, *Exmoor,* 2 y., 3 m.

II. (**£5.**)—Sir W. Williams, Bart., Heanton, Barnstaple, North Devon, *Exmoor,* 1 y., 2 m., 2 w.

III. (£2.)—W. Jones, Penllwyn, Llandewibrefi, Llanio Road, R.S.O., 2 y., 2 m., 2 w., 2 d.

R.—O. Price, Nantyrharn, Cray, Brecon, **Brychan,** 2 y., 2 m., 1 w.

Class 102.—*Pen of Three Mountain Shearling Ewes.* [4 entries.]

I. (£10.)—E. J. Stanley, M.P., Quantock Lodge, Bridgwater, *Exmoors*, 1 y., 3 m.

II. (£5.)—Sir W. Williams, Bart., Heanton, Barnstaple, North Devon, *Exmoors*, 1 y., 2 m., 2 w.

R. & H. C.—E. J. Stanley, M.P., 1 y., 3 m.

WELSH MOUNTAIN.*

Class 103.—*Aged Welsh Mountain Ram.* [4 entries.]

I. (£5), and Extra Prize † (£5).—O. Price, Nantyrharn, Cray, Brecon, **Swansea Boy,** 3 y., 2 m., 2 w., 1 d.

II. (£2.)—W. Jones, Penllwyn, Llandewibrefi, Llanio Road, R.S.O., 2 y., 3 m.

R. & H. C.—O. Price, **Llewellyn,** 3 y., 2 m., 3 d., bred by W. E. Williams, Gwerclas, Corwen, N. Wales.

Class 104.—*Welsh Mountain Shearling Ram.* [3 entries.]

I. (£5.)—O. Price, Nantyrharn, Cray, Brecon, **Tywysog,** 1 y., 2 m.

II. (£2.)—O. Price, **Gryffydd,** 1 y., 2 m., 1 w., 2 d.

R.—W. Jones, Penllwyn, Llandewibrefi, Llanio Road, R.S.O., 1 y., 2 m.

Class 105.—*Pen of Three Welsh Mountain Shearling Ewes.* [2 entries.]

I. (£5), and Extra Prize ‡ (£5.)—O. Price, Nantyrharn, Cray, Brecon, 1 y., 2 m. about.

R. & C.—W. G. Vivian, Clyne Park, Swansea.

OTHER SHORT-WOOL BREEDS.

Class 106.—*Other Short-Wool Shearling Ram.*
[No Entry.]

Class 107.—*Pen of Three Other Short-Wool Shearling Ewes.*
[No Entry.]

---

* The Prizes in Classes 103, 104, and 105 were given by the Glamorganshire Agricultural Society, and competition was confined to residents in South Wales.
† Given by the Swansea Local Committee, for best entry in Class 103 or 104.
‡ Given by the Swansea Local Committee, for best entry in Class 105.

PIGS.

BERKSHIRE.

ASS 108.—*Berkshire Boar, farrowed in* 1889 *or* 1890. [5 entries.]

I. (£7.)—W. PINNOCK, Littleworth House, Wantage, Berks, **Wantage et M.**, 1 y., 8 m., 2 d.; s., Longstop (B.B., 2819); d., Taynton Poetess .B., 2384); s. of d., Lad of the Manor (B.B., 1893).

II. (£3.)—W. PINNOCK, **Wantage Poet N.** Pedigree as above.

III. (£2.)—J. P. KING, North Stoke, Wallingford, **Lord Horsham,** ., 9 m., 2 w., 3 d.; s., Athelhampton; d., Horsham Duchess; s. of d., Walter.

R.—E. BURBIDGE, South Wraxall, Bradford-on-Avon, 1 y., 5 m., 3 w., 1.; s., Vestonia; d., Our Bet; s. of d., Lord Randolph.

CLASS 109.—*Berkshire Boar, farrowed in* 1891. [12 entries.]

I. (£7.)—N. BENJAFIELD, Short's Green Farm, Motcombe, Shaftesbury, n., 3 w., 5 d.

II. (£3.)—R. SWANWICK, R. A. College Farm, Cirencester, 8 m., 2 w., 6 d.; Lord Curzon; d., 1st Choice 4; s. of d., Prince Imperial.

III. (£2.)—N. BENJAFIELD, 11 m., 4 d.

R. & H. C.—J. P. KING, North Stoke, Wallingford, 1 y., 2 m.; s., Athelmpton; d., Ruby 30th; s. of d., Samphire.

H. C.—Mrs. E. E. GWYN, Dyffryn, Neath, Glamorganshire, **Young rly,** 10 m., 3 w., 2 d.; s., Surly 1st; d., Black Paragon; s. of d., Paragon 4).

CLASS 110.—*Berkshire Breeding Sow, farrowed before* 1892. [18 entries.]

I. (£7.)—J. W. KIMBER, Fyfield Wick, Abingdon, 1 y., 4 m., 2 w.; Windsor's Supreme; d., Magnetic; s. of d., Tim of Taynton.

II. (£3.)—W. PINNOCK, Littleworth House, Wantage, Berks, 1 y., 2 m., ., 5 d.; s., Windsor Supreme (B.B. 2814); d., Taynton Poetess (B.B. 34); s. of d., Lad of of the Manor (B.B. 1893).

III. (£2.)—E. BURBIDGE, South Wraxall, Bradford-on-Avon, **Our Bess,** ., 8 m.; s., Lord Randolph; d., Betty; s. of d., Nelson.

H. C.—J. P. KING, North Stoke, Wallingford, 1 y., 1 m., 1 w., 6 d.; Athelhampton; d., Moulsford 36th:—W. PINNOCK, 1 y., 2 m., 3 w., 5 d.; Windsor Supreme (B.B. 2814); d., Taynton Poetess (B.B. 2384); s. of d., d of the Manor (B.B. 1893).

C.—EARL CAWDOR, Stackpole Court, Pembroke, **Baroness,** 1 y., 4 m., w., bred by T. Chick, Stratton, Dorchester; s., Diamond Cutter; d., Lady zie; s. of d., Sir Robert.

ASS 111.—*Pen of Two Berkshire Breeding Sows, farrowed in* 1892. [9 entries.]

I. (£7.)—R. SWANWICK, R. A. College Farm, Cirencester, 4 m., 3 w.; Dau. of Sallie (566); s. of d., Lord Curzon.

II. (£3.)—N. Benjafield, Short's Green Farm, Motcombe, Shaftesbury, 4 m., 2 w., 2 d.

III. (£2.)—J. W. Kimber, Fyfield Wick, Abingdon, 5 m., 6 d.; s., Longstop; d., Magnetic; s. of d., Tim of Taynton.

R. & H. C.—Mrs. E. E. Gwyn, Dyffryn, Neath, Glamorganshire, 4 m., 2 w., 5 d.; s., Surly II.; d., Baglan.

C.—W. Pinnock, Littleworth House, Wantage, 4 m.; s., Columbus (B.B., 3274); d., Wantage Poetess A. (B.B., 3336); s. of d., Longstop (B.B., 2819).

LARGE WHITE BREED.

Class 112.—*Large White Boar, farrowed in* 1889 *or* 1890. [3 entries.]

I. (£7.)—S. Spencer, Holywell Manor, St. Ives, Hunts, **Holywell Bath,** 2 y., 5 m.; s., Holywell Jackie (989); d., Holywell Jewel (2324); s. of d., Holywell King (509).

II. (£3.)—The Guardians, Prescot Union, **Prescot x,** 2 y., 1 m., 2 w.; s., Prescot Joe; d., Whiston III.; s. of d., Belper.

Class 113.—*Large White Boar, farrowed in* 1891. [5 entries.]

I. (£7.)—J. Nuttall, 19 Longfield, Heywood, Lancashire, 1 y., 5 m., 2 w., 2 d.; s., Ben III. (927).

II. (£3.)—S. Spencer, Holywell Manor, St. Ives, Hunts, **Holywell Warwick,** 1 y., 4 m., 4 w.; s., Holywell Dublin; d., Holywell Midge II.; s. of d., Holywell Doctor (975).

III. (£2.)—S. Spencer, **Holywell Major,** 1 y., 4 m., 4 w.; s. Holywell Jackie (989); d., Holywell Shrimp V. (3194); s. of d., Holywell Q.C. (1011).

Class 114.—*Large White Breeding Sow, farrowed before* 1892. [5 entries.]

I. (£7.)—D. Gibson, Metchley, Edgbaston, Birmingham, **Metchley Countess,** 4 y., 2 m., 1 w., 3 d., bred by D. Daybell, Bottesford, Nottingham; s., Young Snub; d., Lancashire Lass III. (746); s. of d., Cropwell Samson (79).

II. (£3.)—S. Spencer, Holywell Manor, St. Ives, Hunts, **Holywell Bonny Girl,** 2 y., 1 m., 1 w., 5 d.; s., Holywell Joseph (1313); d., Bonny Lass (3170); s. of d., Holywell Judge (993).

III. (£2.)—D. Gibson, **Miss Hough V.** (2416), 3 y., 6 m., 3 w., 4 d., bred by F. A. Walker-Jones, Little Mollington, Chester; s., Madman III. (745); d., Miss Hough II. (1270); s. of d., Major (345).

R. & C.—S. Spencer, **Holywell Jewel II.** 2 y., 11 m., 3 d.; s., Holywell Howard (1311); d., Holywell Jewel (2324); s. of d., Holywell King (509).

Class 115.—*Pen of Two Large White Breeding Sows, farrowed in* 1892. [8 entries.]

I. (£7.)—The Guardians, Prescot Union, 4 m., 4 w.; s., Prescot VI.; d., Whiston XI.; s. of d., Prescot.

I. (£3.)—D. GIBSON, Metchley, Edgbaston, Birmingham, 5 m.; s., Duke 63); d., Joan (2378); s. of d., Cardiff (1245).

II. (£2.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 4 w., .; s. Holywell Plymouth (1829); d., Holywell Waxwork (2352); s. of d., lywell King (509).

R. & H. C.—D. GIBSON, 5 m.; s., Duke (1263); d., Joan (2378); s. of d., :diff (1245).

C.—J. NUTTALL, 19, Longfield, Heywood, Lancashire, 21 w., 3 d.

MIDDLE WHITE BREED.

CLASS 116.—*Middle White Boar, farrowed in* 1889 *or* 1890. [5 entries.]

I. (£7.)—A. C. TWENTYMAN, Castlecroft, Wolverhampton, **Castlecroft ing** (1515), 2 y., 11 m., 2 w., 3 d.; s., Silver King (603); d., Tiny (912); of d., The Earl (399).

II. (£3.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, **Holywell urly Boy**, 2 y., 8 m., 2 w., 2 d.; s., Holywell Sulky IV. (1115); d., Holy-ll Curly (1904); s. of d., Curly (387).

III. (£2.)—S. SPENCER, **Holywell Count**, 1 y., 11 m., 1 w., 4 d.; s., rman Baron (815); d., Holywell Straightlocks (2680); s. of d., Holywell 'ell (591).

R.—J. NUTTALL, 19, Longfield, Heywood, Lancashire, 2 y., 4 m., 2 w., 1 d.; Hero II.; d., Snowdrop.

CLASS 117.—*Middle White Boar, farrowed in* 1891. [5 entries.]

I. (£7.)—A. C. TWENTYMAN, Castlecroft, Wolverhampton, **Consul**, 1 y., n., 3 w., 2 d.; s., Young Juan (1551); d., Rosy (2718); s. of d., Silver ng (603).

II. (£3.)—J. NUTTALL, 19, Longfield, Heywood, Lancashire, 1 y., 20 w., l.; s., Hero; d., Lucy.

III. (£2.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, **Holywell aron II.**, , 1 y., 4 m., 3 w., 6 d.; s., German Baron (825); d., Holywell oice (2682); s. of d., Holywell Swell (591).

R.—S. SPENCER, **Holywell Thorn**, 1 y., 4 m., 2 w., 4 d.; s., Holywell asher (2069); d., Holywell Rose (2682); s. of d., Holywell Swell (591).

CLASS 118.—*Middle White Breeding Sow, farrowed before* 1892. [7 entries.]

I. (£7.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, **Holywell issole**, 3 y., 4 m., 1 d.; s., Holywell Ponfield (1113); d., Holywell Curly 904); s. of d., Curly (387).

II. (£3.)—A. C. TWENTYMAN, Castlecroft, Wolverhampton, **Fairy**, 2 y., m., 2 w., 3 d.; s., Silver King (603); d., Tiny (912); s. of d., The Earl 99).

III. (£2.)—S. SPENCER, **Holywell Rose**, 4 y., 2 m., 3 w., 3 d.; s., Holy-ll Swell (591); d., Holywell Duchess (882); s. of d., No. 1 (181).

R. & H. C.—D. GIBSON, Metchley, Edgbaston, Birmingham, **Metchley Dairymaid,** 2 y., 11 m., 1 w., 4 d.; bred by T. Strickland, Thirsk, Yorkshire; s., Boswell II. (817); d., Thirsk Queen (1434); s. of d., Worsley King (607).

CLASS 119.—*Pen of Two Middle White Breeding Sows, farrowed in* 1892. [4 entries.]

I. (£7.)—J. NUTTALL, 19, Longfield, Heywood, Lancashire, 4 m., 3 w., 5 d.; s., Hero; d., Lily.

II. (£3.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 4 w., 1 d.; s., Holywell Count; d., Holywell Selection; s. of d., German Baron.

III. (£2.)—S. SPENCER, 4 m., 4 w., 1 d.; s., Holywell Count; d., Holywell Selection; s. of d., German Baron.

R.—THE GUARDIANS, Prescot Union, 4 m., 4 w.; s., Chieftain II.; d., Whiston Medium; s. of d., Boswell II.

SMALL WHITE OR SMALL BLACK BREED.

CLASS 120.—*Small White or Small Black Boar, farrowed in* 1889 *or* 1890. [3 entries.]

I. (£7.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts; white, **Doncaster,** 2 y., 3 w., 2 d.; s., Earl of Chester (1553); d. Spot 9th (3680); s. of d., Rodney (873).

II. (£3.)—G. PETTIT, The Firs, Friston, Saxmundham, black, **Little Wonder,** 2 y., 10 m., 1 w., 4 d.; s., Duke; d., Ann 2nd.

III. (£2.)—Hon. D. P. BOUVERIE, white, **Bath,** 2 y., 3 w., 2 d.; s., Earl Chester (1553); d., Spot 9th (3680); s. of d., Rodney (873).

CLASS 121.—*Small White or Small Black Boar, farrowed in* 1891. [6 entries.]

I. (£7.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts; white, 11 m., 1 w., 1 d.; s., King William (2097); d., Katherine 3rd; s. of d., Prince.

II. (£3.)—G. PETTIT, Friston, Saxmundham, black, 1 y., 5 d.; s., Danger; d., Patty.

III. (£2.)—Hon. D. P. BOUVERIE, white, 9 m., 2 w., 2 d.; s., King William (2097); d., Coleshill Kitty; s. of d., Prince.

R.—LORD TREDEGAR, Tredegar Park, Newport, Monmouth, white, **Young Tortworth,** 1 y., 2 w.; s., Lord Tortworth; d., Lady Bouverie; s. of d., Prince.

CLASS 122.—*Small White or Small Black Breeding Sow, farrowed before* 1892. [6 entries.]

I. (£7.)—G. PETTIT, The Firs, Friston, black, 1 y., 4 m., 3 w.; s., Duke; d., Primrose.

II. (£3.)—LORD TREDEGAR, Tredegar Park, Newport, Monmouth, white, **Countess of Tortworth,** 2 y., 1 w., 3 d.; bred by Hon. D. P. Bouverie, Coleshill, Highworth, s., Rodney (873); d., Spotless 2nd; s. of d., Prince Pearl (1137).

(£2.)—LORD TREDEGAR, white, **Lady Radnor Bouverie**, 2 y., 2 w., bred by Hon. D. P. Bouverie, Coleshill, Highworth; s., Prince; ·eton (1962); s. of d., Bridgwater (615).

ɛ H. C.—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 11 m., 3 w., 5 d.; s., King William (2097); d., Coleshill Susan ; s. of d., Prince.

·Hon. D. P. BOUVERIE, white, **Coleshill Sunbeam** (3670), 2 y., 3 w., 2 d.; s., Prince; d., Shrewsbury 3rd (1472); s. of d., Jumbo

123.—*Pen of Two Small White or Small Black Breeding Sows, farrowed in* 1892. [5 entries.]

:7.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, white, 2 w.; s., Coleshill Farmer (2093); d., Shaftesbury (3678); s. of d.,

(£3.)—LORD TREDEGAR, Tredegar Park, Newport, Monmouth, white, **Bouverie 4th and 5th**, 4 m., 2 w., 6 d.; s., Lord Tortworth; d., (1964); s. of d., Young Preston (1139).

(£2.)—G. PETTIT, Friston, Saxmundham, black, 4 m., 3 w.; s., d., Patty.

·Hon. D. P. BOUVERIE, white, 5 m., 3 w., 5 d.; s. King William ; d., Coleshill Beauty (3666); s. of d., Prince.

ANY OTHER BREED.

CLASS 124.—*Boar, farrowed in* 1889 *or* 1890.
[NO ENTRY.]

CLASS 125.—*Boar, farrowed in* 1891. [5 entries.]

:7.)—THE GUARDIANS, Prescot Union, a Tamworth, **Prescot Fox** y., 4 m., 3 w.; s., Prescot Fox; d., Whiston Red; s. of d., Nepos.

(£3.)—J. H. JORDAN, Clifford Hill, Stratford-on-Avon, a Tamworth, 6 d.; s., Wallace II. (1661); d., Lady Coventry; s. of d., Warwick (1187).

(£2.)—J. H. JORDAN, a Tamworth, 11 m., 6 d.; s., Wallace II. ; d., Lady Coventry; s. of d., Warwick Prince (1187).

ɛ C.—EARL OF DERBY, Birtley, Witley, Surrey, a Tamworth, 1 y., 2 m., d.; s., Birtley Murphy; d., Lichfield Lady 3rd; s. of d., Dickie.

·J. H. JORDAN, a Tamworth, 11 m., 8 d.; s., Wallace II. (1661); :hesse de Orleans; s. of d., H.R.H. (1147).

ASS 126.—*Breeding Sow, farrowed before* 1892. [2 entries.]

:7.)—EARL OF DERBY, Birtley, Witley, Surrey, a Tamworth, **Lichfield** **ess**, 2 y., 2 m., 1 w., 3 d.; s. Tamworth Duke; d., Lichfield Lady . of d., Dickie.

(£3.)—THE GUARDIANS, Prescot Union, a Tamworth, **Whiston Red**, 1 m., 2 w., 4 d.; bred by W. H. Mitchell, Elmdene, Kenilworth; os; d., Drayton Queen; s. of d., Sambo II.

CLASS 127.—*Pen of two Breeding Sows, farrowed in* 1892.
[NO ENTRY.]

CHEESE.

CLASS 128.—*Four Cheeses (not less than 70 lbs. each), made in* 1891. [16 entries.]

I. (£20), and Champion £5.*—J. MANFIELD, Hambridge, Curry Rivell, Taunton, Somerset.

II. (£10), and R. for Champion.—H. CANNON, Milton Clevedon, Evercreech.

III. (£4.)—BLACKMORE VALE DAIRY COMPANY (Ld.), Lydlinch, Blandford, Dorset.

IV. (£1.)—T. C. CANDY, Woolcombe, Cattistock, Dorset.

R. & V. H. C.—BLACKMORE VALE DAIRY COMPANY (Ld.).

H. C.—T. ALLEN, Crookwood, Devizes.

C.—J. BURFITT, Goodedge Farm, North Bruham, Bruton:—H. CANNON:—and J. HILLARD, Church Farm, Charlton Musgrove, Wincanton.

CLASS 129.—*Four Cheeses (not less than 30 lbs. each) made in* 1892. [10 entries.]

I. (£5.)—W. SALMON, Yonder Broadpool Farm, Doulting, Shepton Mallet.

II. (£4.)—S. J. MARTIN, Waddon Farm, Lamyat, Evercreech, Bath.

III. (£3.)—H. CANNON, Milton Clevedon, Evercreech.

IV. (£2.)—T. C. CANDY, Woolcombe, Cattistock, Dorset.

R. & V. H. C.—C. RYALL, North Cadbury, Bath.

CLASS 130.—*Ten Loaf, or other Truckle Cheeses, made in* 1892. [4 entries.]

I. (£4.)—J. MANFIELD, Hambridge, Curry Rivell, Taunton.

II. (£2.)—C. RYALL, North Cadbury, Bath.

III. (£1.)—S. J. MARTIN, Waddon Farm, Lamyat, Evercreech, Bath.

IV. (10s.)—A. C. RYALL, Whitcombe Dairy, Corton Denham, Sherborne.

CLASS 131.—*Five Cream or other Soft Cheeses.* [5 entries.]

I. (£2.)—E. BROUGH, Wyndyate, near Scarborough.

I. (£2.)—Rev. S. H. WILLIAMS, Great Linford Rectory, Newport Pagnell.

II. (£1.)—Mrs. M. CUSTANCE, Brook Heath, Breamore, Salisbury.

III. (10s.)—G. P. JENKINS, Glen Farm Dairy, Regent Street, Clifton.

CLASS 132.†—*Four Caerphilly Cheeses, made in* 1892. [10 entries.]

I. (£5.)—Miss M. THOMAS, Pentre Davies, Golden Grove, South Wales.

II. (£4.)—W. S. MARSH, Penybedd, Pembrey.

---

* Given by the Swansea Local Committee for best Exhibit in any of the Cheese Classes.

† The Prizes in Class 132 were given by the Swansea Local Committee.

III. (£3.)—C. Ryall, North Cadbury, Bath.

IV. (£2.)—A. C. Ryall, Whitcombe Dairy, Corton Denham, Sherborne.

R. & H. C.—C. C. Green, Pill Farm, Goldcliff, Newport, Monmouth.

C.—C. C. Green.

Class 133.—*Four Cheddar Cheeses made in* 1891, *the total weight being not less than* 2 *cwt.* [15 entries.]

(The Prizes in Classes 133 and 134 were confined to students who had received not less than a week's instruction in one of the Society's Cheese Schools.)

I. (£10), and extra (£5.*) — Mrs. W. T. S. Tilley, North Wootton, Shepton Mallet.

II. (£8.)—Miss F. C. Davis, Farncombe Farm, Shepton Mallet.

III. (£6.)—Miss F. C. Davis.

IV. (£4.)—Mrs. W. T. S. Tilley.

R. & V. H. C.—Mrs. G. Wright, Cranmore, Shepton Mallet.

H. C.—Mrs. E. Collins, Longshouse, Oldford, Frome:—and Mrs. J. Sheppy, Iwood House, Congresbury.

C.—Mrs. M. A. Bown, Mells, near Frome.

Class 134.—*Four Cheddar Cheeses, made in* 1892, *not less than* 30 *lbs. each.* [12 entries.]

I. (£5.)—Mrs. W. T. S. Tilley, North Wootton, Shepton Mallet.

II. (£4.)—Mrs. G. Wright, Cranmore, Shepton Mallet.

III. (£3.)—Miss F. C. Davis, Farncombe Farm, Shepton Mallet.

IV. (£2.)—Miss F. C. Davis.

R. & H. C.—Mrs. J. Sheppy, Iwood House, Congresbury.

C.—Mrs. D. B. Toop, Ryland's Farm, Beckington.

BUTTER AND CREAM.

Class 135.—3 *lbs. of Fresh (or very slightly Salted) Butter, in pound plain rolls or brick shapes, made of Cream from Cows other than Channel Island Breeds.* [35 entries.]

I. (£5), and Champion £5.†—W. Riddle, Oldbury-on-Severn, Thornbury, S.O.

II. (£3.)—T. Allan, Ryde Farm, Ripley, Surrey.

III. (£2.)—J. Williams, Regilbury Park, Winford, Bristol.

IV. (£1.)—M. J. Williams, North Hill Farm, Chew Stoke.

R. & V. H. C.—Mrs. E. Collins, Longshouse, Oldford, Frome.

* Given by the Swansea Local Committee for best Entry in Class 133.

† Given by the Swansea Local Committee for best Entry in any of the Butter Classes.

V. H. C.—T. EMERY, Elm Tree Farm, Portbury, Bristol.

H. C.—T. COLE, Stock Farm, Langford, R.S.O., Bristol:—and A. J. RICHARDSON, Lower Gardens, Lydbury North, Shropshire.

C.—J. CHANNON, Wishford, Broadclist, Exeter:—Mrs. E. DAVIES, Capel Dewi, Carmarthen:—Lt.-Col. J. CURTIS-HAYWARD, Quedgeley, Gloucester:—Mrs. J. OKELL, Park Farm, Barrow, near Chester:—Mrs. PRICE, Nantyrham, Cray, Brecon:—and Mrs. M. YEATES, Barrow Court Farm, Flax Bourton, R.S.O.

CLASS 136.—3 *lbs. of Fresh (or very slightly Salted) Butter, in pound plain rolls or brick shapes, made of Cream from Cows of Channel Island Breeds only.* [15 entries.]

I. (**£4**), and **R.** for Champion—C. C. TUDWAY, Wells, Somerset.

II. (**£2.**)—J. BRUTTON, 7, Princes Street, Yeovil.

III. (**£1.**)—J. WILLIAMS, Regilbury Park, Winford, Bristol.

IV. (**10s.**)—T. Emery, Elm Tree Farm, Portbury, Bristol.

R. & V. H. C.—Mrs. M. CUSTANCE, Brook Heath, Breamore, Salisbury.

V. H. C.—M. J. WILLIAMS, North Hill Farm, Chew Stoke.

H. C.—EARL CADOGAN, Culford, Bury St. Edmunds.

C.—Lt.-Col. J. CURTIS-HAYWARD, Quedgeley, Gloucester:—W. B. RODERICK, Fronhenlog, Llanelly, South Wales.

CLASS 137.—3 *lbs. of Fresh (or very slightly Salted) Butter, in pound plain rolls or brick shapes, made by Students who had attended a course of instruction at any of the Society's Butter Schools.* [17 entries.]

I. (**£5**) and extra (**£5.***)—Miss C. CHILDS, Yeovil Dairy, Yeovil.

II. (**£3.**)—Miss M. J. WILLIAMS, Regilbury Park, Winford, Bristol.

III. (**£2.**)—Miss I. ALLAN, Ryde Farm, Ripley, Surrey.

IV. (**£1.**)—Miss A. A. WALKER, Ockington, Dymock, Gloucestershire.

R. & V. H. C.—Miss M. LEWIS, Llandigwynett, near Pembroke.

H. C.—Miss A. M. Stratton, Carew Newton, near Pembroke.

C.—Miss BURGESS, Mitchell's Farm. Lingfield, Surrey:—Miss F. M. COLE, Stock Farm, Langford, R.S.O., Bristol.

CLASS 138.—12 *lbs. of Salted Butter, in a jar or crock, to be delivered to the Secretary four weeks before the Show.* [15 entries.]

I. (**£4.**)—J. BRUTTON, 7, Princes Street, Yeovil.

II. (**£2.**)—T. COLE, Stock Farm, Langford, R.S.O., Bristol.

III. (**£1.**)—W. RIDDLE, Oldbury-on-Severn, Thornbury, R.S.O.

IV. (**10s.**)—Miss M. LEWIS, Llandigwynett, near Pembroke.

R. & V. H. C.—R. M. TANNER, Woolbeding, Midhurst, Sussex.

H. C.—J. CHANNON, Wishford, Broadclist, Exeter:—M. J. WILLIAMS, North Hill Farm, Chew Stoke:—J. WILLIAMS, Regilbury Park, Winford, Bristol.

---

* Given by the Swansea Local Committee for best Entry in **Class 137.**

C.—Miss I. FALCONER, Gwempa, Kidwelly, South Wales:—F. OSBORNE, ston Town, Marshfield, Chippenham.

ASS 139.—*4 half-pounds of Clotted or Devonshire Cream, packed either in tins or earthen jars.* [10 entries.]

I. (£2.)—W. BEER, Trinity Dairy, Barnstaple, Devon.

II. (£1.)—G. P. JENKINS, Glen Farm Dairy, Regent Street, Clifton.

III. (10s.)—Mrs. E. E. GWYN, Dyffryn, Neath, Glamorganshire.

R. & V. H. C.—CRIDDLE BROS., Locking Road Dairy, Weston-super-are.

H. C.—H. W. LEAKER, Woodland Dairy, Swansea.

C.—C. C. TUDWAY, Wells, Somerset.

BUTTER-MAKING COMPETITIONS.

(ot open to Makers or Vendors of Churns or their Assistants, *or to any previous winner of the Society's Champion Gold Medal.*)

LASS 140.—*Best and largest quantity of Butter, made from a given quantity of Cream, in the cleanest and most approved style, on the first day of the Show by Students who had attended a course of instruction at any of the Society's Butter Schools.* [42 entries.]

(The first Prize in Class 140 was given by the Swansea Local Committee.)

I. (£5.)—Miss R. CHARLES, Great Wacton, Bromyard.

II. (£3.)—Miss S. A. H. DIGWOOD, The Chesterfields, Feckenham, Red-tch.

III. (£1 10s.)—Miss A. A. WALKER, Ockington, Dymock, Gloucester-iire.

IV. (10s.)—Miss M. LEWIS, Llandigwynett, Pembroke.

R. & V. H. C.—Miss A. M. STRATTON, Carew Newton, near Pembroke.

H. C.—Miss A. M. EVANS, 11, Gwyther Street, Pembroke Dock, South 'ales:—Miss M. HOWELLS, Castle Ely, Kiffig, Narberth, Carmarthenshire: Miss A. METHIES, Campshill, Yerbertan:—Miss N. STOKES, 6, Croft rrace, Tenby:—Mrs. M. YEATES, Barrow Court Farm, Flax Bourton, S.O.:—Miss I. ALLAN, Ryde Farm, Ripley, Surrey:—and Miss ASHMAN, ulton, Bristol.

C.—Miss J. BURROUGH, Smithfield Farm, Butleigh, Glastonbury:—Miss DAVIES, Knowles Farm, Pembroke:—Miss JENKINS, Glanywern, Talsarn, uth Wales:—Miss E. LOXTON, West Pennard, Glastonbury:—N. MINIFIE, , High Street, Weston-super-Mare:—Miss M. TILLEY, Compton House, mpton Bishop, Axbridge, Somerset:—Miss M. A. WARREN, Tudbeer rm, Chard, Somerset:—Miss M. E. GORDON, Tile House Farm, Burry's reen, Gower, Swansea:—Mrs. R. E. GORDON, Weobley Castle, Reynold-on, Swansea:—Miss S. J. OWEN, The Hayes, Reynoldston, Swansea:—iss M. TUCKER, Slade Farm, Gower, Swansea:—Miss L. STEELE, Rey-ldston, Gower:—Miss S. A. HOSKINS, Berry Farm, Reynoldston:—Miss M. KIRBY, Penllergare Farm, Swansea:—Miss C. M. BEVAN, Tregeryndd,

Swansea:—Miss P. Mainwaring, Brynhos Farm, Gorseinon, Swansea:—Miss C. Mordecai, Ynycaian, St. Mary Hill, Bridgend:—and Miss Kate Stallard, East Harptree.

Class 141.—*Best and largest quantity of Butter, made from a given quantity of Cream, in the cleanest and most approved style, on the second day of the Show, open to any woman, without restriction as to School.* [42 entries.]

(The first Prize in Class 141 was given by the Swansea Local Committee.)

I. (£5.)—Miss I. Allan, Ryde Farm, Ripley, Surrey.

II. (£3.)—Miss A. A. Walker, Ockington, Dymock, Gloucestershire.

III. (£1 10s.)—Miss N. Stokes, 6, Croft Terrace, Tenby.

IV. (10s.)—Miss A. M. Stratton, Carew Newton, near Pembroke.

R. & V. H. C.—Mrs. R. E. Gordon, Weobley Castle, Reynoldston, Swansea.

H. C.—Miss S. A. H. Digwood, The Chesterfields, Feckenham, Redditch:—Miss A. M. Evans, 11, Gwyther Street, Pembroke Dock, South Wales:—Mrs. M. Yeates, Barrow Court Farm, Flax Bourton, R.S.O.:—Mrs. M. J. Williams, Regilbury Park, Winford:—Miss M. Howells, Castle Ely, Kiffig, Narberth, Carmarthen:—and Miss Watts, Whitfield Farm, Tortworth, Falfield, R.S.O.

C.—Miss J. Burrough, Smithfield Farm, Butleigh, Glastonbury:—Mrs. M. A. Cambidge, High Hall, Blymhill, near Shifnal:—Miss F. M. Cole, Stock Farm, Langford, R.S.O., Bristol:—Miss R. Davies, Knowles Farm, Pembroke:—Miss E. Phillips, Wester House, Llangennith, Gower, Reynoldston:—Miss Jenkins, Glanywern, Talsarn, South Wales:—Miss E. M. Bevan, Bay View House, Overton, Gower:—Miss S. J. Owen, The Hayes, Reynoldston, Swansea:—Mrs. J. Tucker, The Beeches, Horton Gower, Swansea:—Miss B. J. Kirby, Penllergare Farm, Swansea:—Miss M. E. Kirby, Penllergare Farm, Swansea:—Miss Kate Stallard, East Harptree:—Miss Ashman, Paulton, Bristol:—Miss C. M. Bevan, Tregernydd, Swansea:—Miss A. Methies, Campshill, Yerberton:—Miss M. Walters, Ivy Cottage, Heolddue, Llangyfelach:—Miss C. Mordecai, Ynycaian, St. Mary Hill, Bridgend:—and Miss G. Jenkins, Treos, Bridgend.

Class 142.—*Best and largest quantity of Butter, made from a given quantity of Cream, in the cleanest and most approved style, on the third day of the Show, open to any man or woman, except the winner of the* 1*st Prize in Class* 141. [46 entries.]

I. (£5.)—Mrs. M. J. Williams, Regilbury Park, Winford.

II. (£3.)—Miss Jenkins, Glanywern, Talsarn, South Wales.

III. (£1 10s.)—Miss A. A. Walker, Ockington, Dymock, Gloucestershire.

IV. (10s.)—Miss E. Jones, Knighton Farm, Stogursey, Bridgwater.

IV. (10s.)—Miss S. A. H. Digwood, The Chesterfields, Feckenham, Redditch.

R. & V. H. C.—Miss E. Phillips, Wester House, Llangennith, Gower, Reynoldston.

H. C.—Mrs. M. A. Cambidge, High Hall, Blymhill, near Shifnal:—Miss '. M. Cole, Stock Farm, Langford, R.S.O., Bristol:—Miss A. M. Evans, 1, Gwyther Street, Pembroke Dock, South Wales:—N. Minifie, 92, High treet, Weston-super-Mare:—Miss N. Stokes, 6, Croft Terrace, Tenby:— .. Worman, Walcombe Dairy, Wells, Somerset:—Mrs. M. Yeates, Barrow ourt Farm, Flax Bourton, R.S.O.:—Mrs. R. E. Gordon, Weobley Castle, eynoldston, Swansea:—Miss S. J. Owen, The Hayes, Reynoldston, Swan-a:—Miss L. Steele, Reynoldston, Gower:—Miss M. E. Kirby, Penller-are Farm, Swansea:—Miss Kate Stallard, East Harptree:—Miss Ash-an, Paulton, Bristol:—Miss R. Davies, Knowles Farm, Pembroke:—Miss [. Howells, Castle Ely, Kiffig, Narberth, Carmarthen:—Miss M. Lewis, landigwynett, Pembroke:—Miss A. Methies, Campshill, Yerberton:— [iss M. Walters, Ivy Cottage, Heolddue, Llangyfelach:—Miss Watts, /hitfield Farm, Tortworth, Falfield, R.S.O.:—Miss P. Mainwaring, Brynrhos arm, Gorseinon, Swansea:—Miss C. Mordecai, Ynycaian, St. Mary Hill, ridgend:—and Miss G. Jenkins, Treos, Bridgend.

C.—Miss J. Burrough, Smithfield Farm, Butleigh, Glastonbury:—G. P. enkins, Glen Farm Dairy, Regent Street, Clifton:—Miss E. Moss, Rockfield arm, Monmouth:—Miss A. M. Stratton, Carew Newton, near Pembroke: -Miss M. Tilley, Compton House, Compton Bishop, Axbridge:—Miss . M. Bevan, Bay View House, Overton, Gower:—Mrs. J. Tucker, The eeches, Horton Gower, Swansea:—Miss B. J. Kirby, Penllergare Farm, wansea:—Miss C. M. Bevan, Tregernydd, Swansea:—Miss M. A. Warren, 'udbeer Farm, Chard:—and Miss M. C. Hodder, The Farm, High Street, Vinsham, near Chard.

'lass 143.—*Best and largest quantity of Butter, made from a given quantity of Cream, in the cleanest and most approved style, on the fourth day of the Show, open to any man or woman, except the winners of the* 1*st Prizes in Classes* 141 *and* 142. [45 entries.]

I. (£5.)—Miss Watts, Whitfield Farm, Tortworth Court, Falfield, R.S.O.

II. (£3.)—Mrs. M. Yeates, Barrow Court Farm, Flax Bourton, R.S.O.

III. (£1 10s.)—Miss M. Lewis, Llandigwynett, Pembroke.

IV. (10s.)—Miss A. A. Walker, Ockington, Dymock, Gloucestershire.

R. & V. H. C.—Miss G. Jenkins, Treos, Bridgend.

H. C.—Miss J. Burrough, Smithfield Farm, Butleigh, Glastonbury:— liss F. M. Cole, Stock Farm, Langford:—Miss S. A. H. Digwood, The 'hesterfields, Feckenham, Redditch:—Miss A. M. Evans, 11, Gwyther treet, Pembroke Dock, S. Wales:—G. P. Jenkins, Glen Farm Dairy, legent Street, Clifton:—Miss E. Moss, Rockfield Farm, Monmouth:—C. I. lenouf, 34, Kingston, Yeovil:—Miss A. M. Stratton, Carew Newton, near 'embroke:—Miss E. M. Bevan, Bay View House, Overton, Gower:—Mrs. l. E. Gordon, Weobley Castle, Reynoldston, Swansea:—Miss L. Steele, leynoldston, Gower:—Miss Ashman, Paulton, Bristol:—Miss M. Howells, 'astle Ely, Kiffig, Narberth, Carmarthen:—Miss E. Jones, Knighton Farm, togursey, Bridgwater:—and Miss M. Walters, Ivy Cottage, Heolddue, langyfelach.

C.—Mrs. M. A. Cambidge, High Hall, Blymhill, near Shifnal:—Miss enkins, Glanywern, Talsarn, South Wales:—N. Minifie, Grove Park)airy, Weston-super-Mare:—Miss N. Stokes, 6, Croft Terrace, Tenby:— liss M. Tilley, Compton House, Compton Bishop, Axbridge:—A. Worman, Valcombe Dairy, Wells, Somerset:—Miss S. J. Owen, The Hayes, Reynoldton, Swansea:—Mrs. J. Tucker, The Beeches, Horton Gower, Swansea:—

Miss E. PHILLIPS, Wester House, Llangennith, Gower, Reynoldston:—Miss B. J. KIRBY, Penllergare Farm, Swansea:—Miss M. E. KIRBY, Penllergare Farm, Swansea:—Miss KATE STALLARD, East Harptree:—Miss C. M. BEVAN, Tregernydd, Swansea:—Miss R. DAVIES, Knowles Farm, Pembroke:—Miss A. METHIES, Campshill, Yerberton:—Miss M. A. WARREN, Tudbeer Farm, Chard:—Miss P. WAINWARING, Brynrhos Farm, Gorseinon, Swansea:—and Miss C. MORDECAI, Ynycaian, St. Mary Hill, Bridgend.

CHAMPION PRIZES.

Competed for on the fifth day of the Show by the winners of Prizes in Classes 140, 141, 142, *and* 143.

I. Champion Prize (**Gold Medal and Certificate**) and *Extra Prize (**Silver Cup.**)—Mrs. M. J. WILLIAMS, Regilbury Park, Winford.

II. (**Silver Medal and Certificate.**)—Miss A. A. WALKER, Ockington, Dymock, Gloucestershire.

III. (**Bronze Medal and Certificate.**)—Miss S. A. H. DIGWOOD, The Chesterfields, Feckenham, Redditch.

R. & V. H. C.—Miss WATTS, Whitfield Farm, Tortworth, Falfield, R.S.O., Gloucestershire.

V. H. C.—Miss R. CHARLES, Great Wacton, Bromyard:—Miss M. LEWIS, Llandigwynett, Pembroke:—Miss N. STOKES, 6, Croft Terrace, Tenby:—Miss I. ALLAN, Ryde Farm, Ripley, Surrey:—Miss A. M. STRATTON, Carew Newton, near Pembroke:—Miss JENKINS, Glanywern, Talsarn, S. Wales:—Miss E. JONES, Knighton Farm, Stogursey, Bridgwater:—and Mrs. M. YEATES, Barrow Court Farm, Flax Bourton, R.S.O.

DAIRY APPLIANCES.

CLASS 144.—*A Gold Medal was offered for the best Milking Machine.*
[NO ENTRY.]

HORSE-SHOEING COMPETITION.

CLASS 145.—*Best Shoeing of a Nag Horse by a Smith in the Show Yard on the third day of Show.* [**47 entries.**]

A pair of Shoeing Models and a copy of Miles's 'Treatise on Shoeing' was presented to each winner of a Prize; and each commended Competitor was presented with one Shoeing Model and a copy of Miles's 'Treatise on Shoeing.'

The Registration Committee of the Farriers' Company admitted all the winners of Prizes and Commendations in this Competition to the Official Register *free of charge.*

I. (£3 3s.)—JOHN RUDGE, Brampton, Madley, Herefordshire.

II. (£2 2s.)—W. RUDGE, Brampton, Madley, Herefordshire.

* Given by the President (Sir J. T. D. Llewellyn, Bart.) to the winner of the first Prize in the Champion Competition, a Silver Cup value £10 10s.

III. (£1 1*s.*)—J. SANDERS, 52, Terrace Road, Swansea.

V. H. C.—E. DAVIES, 47, Castle Street, Merthyr:—E. OWEN, 29, Glebeland Street, Merthyr Tydvil:—D. PRICE, Nelson, near Treharris, R.S.O.:—JAMES RUDGE, Brampton, Madley, Herefordshire:—and T. WILLIAMS, Quaker's Yard Inn, near Treharris, Glamorganshire.

H. C.—D. FRANCIS, 7, Post Office Lane, Merthyr Tydvil:—J. REES, Abercorn Colliery, near Newport:—E. THOMAS, Mount Pleasant, Porth Shoeing Forge, Porth:—and E. T. WATKINS, Greyhound Shop, Maisteg.

C.—H. C. FRANCIS, Green Street, Aberdare:—and R. JOHN, Kenfig Hill, near Bridgend.

FLANNEL AND KNITTING.

CLASS 146.—*Best Piece of White Flannel, 48 yards long and 27 inches wide.* [1 entry.]

I. (£2.)—M. GRIFFITHS, Alexandra Buildings, High Street, Swansea.

CLASS 147.—*Best Piece of Blue Grey Shirting Flannel, 48 yards long and 27 inches wide.* [1 entry.]

I. (£2.)—M. GRIFFITHS, Alexandra Buildings, High Street, Swansea.

CLASS 148.—*Best Piece of Tweed, 48 yards long and 27 inches wide.* [1 entry.]

[NO AWARD.]

CLASS 149.*—*Best Pair of plain hand-knitted (not hand-machine) Stockings, knitted from two-fold Navy Blue Yarn, manufactured in South Wales from Local Grown Wool.* [95 entries.]

I. (£2 2*s.*)—Mrs. M. JONES, Blaenythan, Llandyssil.

II. (£1 1*s.*)—Mrs. S. REES, Clifton Terrace, Llandyssil.

III. (15*s.*)—Miss M. JONES, 5, Troedyrhiw Terrace, Treorky, Rhondda Valley.

IV. (10*s.* 6*d.*)—Mrs. A. RICHARDS, 9, Little Water Street, Carmarthen.

V. (7*s.* 6*d.*)—Miss A. WILLIAMS, Cwmrhydycewri, Morriston.

VI. (5*s.*)—Mrs. MARGARET DAVIES, 16, Darran Road, Mountain Ash.

* Given by Messrs. Parry and Rocke, Swansea.

SWANSEA MEETING, 1892.

Award of Prizes for Poultry.

Abbreviations used.—y., year; m., month; w., week; d., day; V. H. C, Very Highly Commended; H. C., Highly Commended; C., Commended.

SECTION I.—GENERALLY USEFUL BREEDS.

CLASS 1.—COCHIN (CINNAMON and BUFF) COCKS. [8 entries.]

I. (£1 10s.)—Mrs. SCRIVEN, *buff*, over 1 y.
II. (15s.)—E. CLATWORTHY, *buff*, 13 m.
III. (5s.)—H. TOMLINSON, *buff*, over 1 y.
V. H. C.—J. BROOKE, *buff*:—Mrs. SCRIVEN, *buff*, over 1 y.

CLASS 2.—COCHIN (CINNAMON and BUFF) HENS. [5 entries.]

I. (£1 10s.)—H. TOMLINSON, *buff*, over 1 y.
II. (15s.)—J. HITCHMAN, *cinnamon*, 2 y. about.
III. (5s.)—E. CLATWORTHY, *buff*, 13 m.

CLASS 3.—COCHIN (PARTRIDGE-FEATHERED OR WHITE) COCKS. [3 entries.]

I. (£1 10s.)—Rev. G. T. LAYCOCK, *white*.
II. (15s.)— G. H. WOOD, *partridge*, various.
III. (5s.)—H. TOMLINSON, *white*, over 1 y.

CLASS 4.—COCHIN (PARTRIDGE-FEATHERED or WHITE) HENS. [5 entries.]

I. (£1 10s.)—J. BUCKMASTER, *white*, 2 y.
II. (15s.)—Rev. G. T. LAYCOCK, *white*.
III. (5s.)—R. DEAR, *partridge*, 1 y., 4 m.
H. C.—R. DEAR, *partridge*, 2 y., 3 m.

CLASS 5.—BRAHMA (DARK) COCKS. [3 entries.]

I. (£1 10s.)—A. E. MORGAN, over 2 y.
II. (15s.)—J. BROOKE.
III. (5s.)—S. W. THOMAS, over 1 y.

CLASS 6.—BRAHMA (DARK) HENS. [2 entries.]

I. (£1 10s.)—S. W. THOMAS, over 1 y.
II. (15s.)—J. BROOKE.

CLASS 7.—BRAHMA (LIGHT) COCKS. [3 entries.]

. (£1 10s.)—G. H. WOOD, various.

I. (15s.)—E. SCAMMELL, 2 y.

CLASS 8.—BRAHMA (LIGHT) HENS. [5 entries.]

. (£1 10s.)—G. H. WOOD, various.

I. (15s.)—J. BROOKE.

II. (5s.)—H. REES, 2 y.

I. C.—E. SCAMMELL, 2 y.

CLASS 9.—LANGSHAN COCKS. [10 entries.]

. (£1 10s.)—J. KEOUGH, over 1 y.

I. (15s.)—Rev. G. T. LAYCOCK.

II. (5s.)—A. G. PHILLIPS, 13 m.

I. C.—Rev. G. T. LAYCOCK :—A. G. PHILLIPS, 13 m. :—Dr. G. C. SEARLE, m.

CLASS 10.—LANGSHAN HENS. [8 entries.]

. (£1 10s.)—Rev. G. T. LAYCOCK.

I. (15s.)—A. G. PHILLIPS, 13 m.

II. (5s.)—A. G. PHILLIPS, 13 m.

7. H. C.—C. SEABROOKE, 1891.

I. C.—Rev. G. T. LAYCOCK :—and S. MILLARD, 1890.

CLASS 11.—PLYMOUTH ROCK COCKS. [5 entries.]

. (£1 10s.)—S. W. THOMAS, over 1 y.

I. (15s.)—J. H. DAVIS, 2 y.

II. (5s.)—S. W. THOMAS, over 1 y.

I. C.—H. J. WOOD, over 1 y.

CLASS 12.—PLYMOUTH ROCK HENS. [7 entries.]

. (£1 10s.)—W. E. DAINTON, 13 m.

I. (15s.)—S. W. THOMAS, over 1 y.

II. (5s.)—H. J. WOOD, over 1 y.

CLASS 13.—WYANDOTTE COCKS. [3 entries.]

. (£1 10s.)—W. TARVER, 14 m.

I. (15s.)—G. T. WHITFIELD.

II. (5s.)—C. SEABROOKE, 1891.

CLASS 14.—WYANDOTTE HENS. [3 entries.]

. (£1 10s.)—W. TARVER, 4 y.

I. (15s.)—J. R. BENNETT, 13 m.

II. (5s.)—Mrs. E. OLIVER, over 1 y.

CLASS 15.—CHICKENS OF 1892 (COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, or WYANDOTTE)—COCKERELS. [9 entries.]

I. (**£1 10s.**)—J. A. SLATTER, *Partridge Cochin*, 6 m.

II. (**15s.**)—J. BROOKE.

III. (**5s.**)—M. GOLDSMITH, *Langshan*, 4 m., 2 w.

H. C.—H. GAMMON, *Plymouth Rock*, 3 m.

CLASS 16.—CHICKENS OF 1892 (COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, or WYANDOTTE)—PULLETS. [10 entries.]

I. (**£1 10s.**)—J. BROOKE.

II. (**15s.**)—Mrs. S. R. HARRIS, *Buff Cochin.*

III. (**5s.**)—R. DEAR, *Partridge Cochin*, 4 m., 3 w.

V. H. C.—Mrs. S. R. HARRIS, *Buff Cochin.*

H. C.—NORTH WALES POULTRY YARD, 19 w.

SECTION II.—**LAYING OR NON-SETTING BREEDS.**

CLASS 17.—SPANISH COCKS. [5 entries.]

I. (**£1 10s.**)—J. HUNT, 11 m.

II. (**15s.**)—R. P. WHEADON.

III. (**5s.**)—G. H. BUESNEL, 14 m.

CLASS 18.—SPANISH HENS. [9 entries.]

I. (**£1 10s.**)—J. HUNT, 2 y.

II. (**15s.**)—J. AUCKLAND.

III. (**5s.**)—R. P. WHEADON.

H. C.—R. P. WHEADON :—J. WOODS, 2 y. :—and C. W. BRIERLEY, over 1 y.

CLASS 19.—MINORCA COCKS. [10 entries.]

I. (**£1 10s.**)—A. G. PITTS, 13 m.

II. (**15s.**)—H. J. SMALLCOMBE, 15 m.

III. (**5s.**)—W. H. STOYEL, 15 m.

V. H. C.—M. MORRIS, 12 m. (twice).

H. C.—W. SNELL, 15 m. :—and R. YEO, 1 y.

CLASS 20.—MINORCA HENS. [8 entries.]

I. (**£1 10s.**)—A. G. PITTS, 6 y.

II. (**15s.**)—A. G. PITTS, 13 m.

III. (**5s.**)—R. YEO.

H. C.—W. PRICE, 2 y. :—H. J. SMALLCOMBE, 15 m. :—and W. SNELL, 15 m.

Class 21.—LEGHORN (Any Variety) COCKS. [2 entries.]

I. (£1 10s.)—F. Mitchell.

II. (15s.)—J. Thomas, 15 m.

Class 22.—LEGHORN (Any Variety) HENS. [2 entries.]

I. (£1 10s.)—W. M. Hall, *white*, 1891.

II. (15s.)—F. Mitchell.

Class 23.—ANDALUSIAN COCKS.
[No Entry.]

Class 24.—ANDALUSIAN HENS. [2 entries.]

I. (£1 10s.)—G. S. Oldham, 2 y.

II. (15s.)—M. Morris, 3 y.

Class 25.—HOUDAN COCKS. [3 entries.]

I. (£1 10s.)—P. Hanson, over 1 y.

II. (15s.)—S. W. Thomas, over 1 y.

III. (5s.)—S. W. Thomas, over 1 y.

Class 26.—HOUDAN HENS. [3 entries.]

I. (£1 10s.)—P. Hanson, over 1 y.

II. (15s.)—S. W. Thomas, over 1 y.

III. (5s.)—S. W. Thomas, over 1 y.

Class 27.—POLISH FOWL, COCKS. [6 entries.]

I. (£1 10s.)—A. Smith.

II. (15s.)—A. Smith.

III. (5s.)—J. Rawnsley.

H. C.—F. Mitchell:—and A. E. Morgan, over 2 y.

Class 28.—POLISH FOWL, HENS. [5 entries.]

I. (£1 10s.)—A. Smith.

II. (15s.)—J. Rawnsley.

III. (5s.)—D. W. Lewis.

H. C.—A. E. Morgan, over 2 y.

Class 29.—HAMBURG (Golden Spangled) COCKS. [4 entries.]

I. (£1 10s.)—J. Rawnsley.

II. (15s.)—W. and J. Jackson.

III. (5s.)—F. Mitchell.

CLASS 30.—HAMBURG (GOLDEN SPANGLED) HENS. [4 entries.]

I. (£1 10s.)—J. RAWNSLEY.
II. (15s.)—F. MITCHELL.
III. (5s.)—W. and J. JACKSON.
H. C.—H. PICKLES, 18 m.

CLASS 31.—HAMBURG (SILVER SPANGLED) COCKS. [5 entries.]

I. (£1 10s.)—Rev. S. ASHWELL, 15 m.
II. (15s.)—H. PICKLES, 18 m.
III. (5s.)—J. RAWNSLEY.
V. H. C.—D. W. LEWIS.
H. C.—F. MITCHELL.

CLASS 32.—HAMBURG (SILVER SPANGLED) HENS. [6 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.
II. (15s.)—J. RAWNSLEY.
III. (5s.)—D. W. LEWIS.
H. C.—F. MITCHELL:—and G. THORNBURY, 2 y.

CLASS 33.—HAMBURG (GOLDEN PENCILLED) COCKS. [5 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.
II. (15s.)—F. MITCHELL.
III. (5s.)—J. RAWNSLEY.
V. H. C.—M. JACKSON.

CLASS 34.—HAMBURG (GOLDEN PENCILLED) HENS. [6 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.
II. (15s.)—J. RAWNSLEY.
III. (5s.)—W. and E. J. MARSHALL, 3 y.
H. C.—E. CORKE, 1891:—and F. MITCHELL.

CLASS 35.—HAMBURG (SILVER PENCILLED) COCKS. [4 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.
II. (15s.)—G. J. ROSSER, 1 y.
III. (5s.)—J. RAWNSLEY.

CLASS 36.—HAMBURG (SILVER PENCILLED) HENS. [3 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.
II. (15s.)—J. RAWNSLEY.
III. (5s.)—F. MITCHELL.

CLASS 37.—HAMBURG (BLACK) COCKS. [5 entries.]

I. (£1 10s.)—Rev. G. T. LAYCOCK.

II. (15s.)—H. PICKLES, 18 m.

III. (5s.)—J. RAWNSLEY.

H. C.—H. HOPKINS, 14 m.:—F. MITCHELL.

CLASS 38.—HAMBURG (BLACK) HENS. [8 entries.]

I. (£1 10s.)—H. PICKLES, 18 m.

II. (15s.)—H. HOPKINS, 2 y.

III. (5s.)—Rev. G. T. LAYCOCK.

V. H. C.—D. W. LEWIS:—F. MITCHELL:—J. RAWNSLEY:—and G. HORNBURY, 13 m.

ASS 39.—CHICKENS OF 1892 (SPANISH, MINORCA, LEGHORN, ANDALUSIAN, HOUDAN, POLISH, OR HAMBURG)—COCKERELS. [6 entries.]

I. (£1 10s.)—P. SMITH, *Spanish*, hatched Jan 7th.

II. (15s.)—W. H. STOYEL, *Minorca*, 19 w.

III. (5s.)—F. HARVEY, *Spanish*, 19 w.

ASS 40.—CHICKENS OF 1892 (SPANISH, MINORCA, LEGHORN, ANDALUSIAN, HOUDAN, POLISH, OR HAMBURG)—PULLETS. [5 entries.]

I. (£1 10s.)—P. SMITH, *Spanish*, hatched Jan. 7th.

II. (15s.)—J. BUTTERWORTH, *Golden Polish*, 20 w.

III. (5s.)—G. F. HIGGINSON, *brown Leghorn*, Jan 4th, 1892.

SECTION III.—**BREEDS SUITABLE FOR THE TABLE.**

CLASS 41.—DORKING (COLOURED) COCKS. [8 entries.]

I. (£1 10s.)—T. HAY, 2 y.

II. (15s.)—R. B. CURTEIS, 2 y.

III. (5s.)—D. T. WILLIAMS.

V. H. C.—J. HARRIS, 1 y., 11 d.:—H. MURTON, 1891:—A. THOMAS, m.

CLASS 42.—DORKING (COLOURED) HENS. [7 entries.]

I. (£1 10s.)—J. HARRIS, over 1 y.

II. (15s.)—Rev. L. E. SWEET, various.

III. (5s.)—H. MURTON, 1890.

V. H. C.—W. V. H. THOMAS:—Rev. L. E. SWEET, various.

H. C.—W. V. H. THOMAS.

CLASS 43.—DORKING (SILVER GREY) COCKS. [3 entries.]

I. (£1 10s.)—O. E. CRESSWELL, over 1 y.

II. (15s.)—J. M. STOCKBRIDGE, 18 m.

Class 44.—DORKING (Silver Grey) HENS. [8 entries.]

I. (£1 10s.)—O. E. Cresswell, over 1 y.
II. (15s.)—J. Clunas, 2 y., 2 m.
III. (5s.)—O. E. Cresswell, over 1 y.
V. H. C.—J. Clunas, 1 y., 2 m.

Class 45.—DORKING (White or Cuckoo) COCKS. [4 entries.]

I. (£1 10s.)—J. Pettipher, over 1 y.
II. (15s.)—O. E. Cresswell, *white*, over 1 y.
III. (5s.)—O. E. Cresswell, *white*, over 1 y.

Class 46.—DORKING (White or Cuckoo) HENS. [5 entries.]

I. (£1 10s.)—O. E. Cresswell, *white*, over 1 y.
II. (15s.)—R. C. Harrisson, *white*.
III. (5s.)—O. E. Cresswell, *white*, over 1 y.
H. C.—O. E. Cresswell, *white*, over 1 y.:—J. Pettipher, over 1 y.

Class 47.—GAME (Black-Breasted Reds) COCKS. [5 entries.]

I. (£1 10s.)—C. W. Brierley, over 1 y.
II. (15s.)—F. C. Tomkins.
III. (5s.)—C. F. W. Jackson, over 1 y.
H. C.—D. John, 12 m.

Class 48.—GAME (Black-Breasted Reds) HENS. [5 entries.]

I. (£1 10s.)—C. W. Brierley, over 1 y.
II. (15s.)—F. C. Tomkins.
III. (5s.)—C. W. Brierley, over 1 y.
V. H. C.—C. F. W. Jackson.
H. C.—G. J. Rosser, 1 y.

Class 49.—GAME (Brown-Breasted Reds) COCKS. [3 entries.]

I. (£1 10s.)—C. W. Brierley, over 1 y.
II. (15s.)—G. J. Rosser, 2½ y.
III. (5s.)—A. Golledge, 14 m.

Class 50.—GAME (Brown-Breasted Reds) HENS. [3 entries.]

I. (£1 10s.)—C. W. Brierley, over 1 y.
II. (15s.)—C. W. Brierley, over 1 y.
III. (5s.)—G. J. Rosser, 10½ m.

CLASS 51.—GAME (PILE OR ANY OTHER VARIETY) COCKS. [4 entries.]

I. (£1 10s.)—C. W. BRIERLEY, over 1 y.

II. (15s.)—C. W. BRIERLEY, over 1 y.

III. (5s.)—J. C. HUXTABLE, *Pile*, over 1 y.

H. C.—F. C. TOMKINS, *Pile.*

CLASS 52.—GAME (PILE OR ANY OTHER VARIETY) HENS. [6 entries.]

I. (£1 10s.)—C. W. BRIERLEY, over 1 y.

II. (15s.)—C. W. BRIERLEY, over 1 y.

III. (5s.)—J. W. MORTON, *Birchen*, 14 m.

H. C.—F. MITCHELL, *Pile*:—E. C. PHILLIPS, 2 y.:—J. C. HUXTABLE, *Pile*, over 1 y.

CLASS 53.—MALAY COCKS. [3 entries]

I. (£1 10s.)—JOHN FRAYN.

II. (15s.)—J. C. HUXTABLE, about 1 y.

III. (5s.)—J. C. HUXTABLE, about 1 y.

CLASS 54.—MALAY HENS. [4 entries.]

I. (£1 10s.)—JOHN FRAYN.

II. (15s.)—J. C. HUXTABLE, over 1 y.

III. (5s.)—J. C. HUXTABLE, over 1 y.

CLASS 55.—INDIAN GAME COCKS. [5 entries.]

I. (£1 10s.)—JOHN FRAYN.

II. (15s.)—JAMES FRAYNE, various.

III. (5s.)—J. C. HUXTABLE, over 1 y.

H. C.—H. REES, 1 y.:—E. STRIKE.

CLASS 56.—INDIAN GAME HENS. [7 entries.]

I. (£1 10s.)—JAMES FRAYNE, various.

II. (15s.)—JOHN FRAYN.

III. (5s.)—J. KITCHIN.

V. H. C.—Miss M. BENSON, 2 y., 2 m.

H. C.—E. STRIKE.

CLASS 57.—ANY OTHER DISTINCT VARIETY NOT MENTIONED—COCKS. [5 entries.]

I. (£1 10s.)—J. RAWNSLEY.

II. (15s.)—S. W. THOMAS, *Crêve*, over 1 y.

III. (5s.)—H. SCOTT-HALL, *Old English Game*, 2 y., 2 m.

V. H. C.—H. SCOTT-HALL, *Old English Game*, 2 y., 2 m.:—Mrs. MEREDITH-BROWN, *Scotch grey*, 1 y.

CLASS 58.—ANY OTHER DISTINCT VARIETY NOT MENTIONED—HENS. [8 entries.]

I. (£1 10s.)—S. W. THOMAS, *Crêve*, over 1 y.

II. (15s.)—F. MITCHELL.

III. (5s.)—Mrs. MEREDITH-BROWN, *Scotch Grey*, various.

H. C.—H. SCOTT-HALL, *Old English Game*, 2 y., 3 m. :—H. SCOTT-HALL. *Old English Game*, 1 y., 2 m.

CLASS 59.—CHICKENS OF 1892 (DORKING, GAME, MALAY, INDIAN GAME, OR ANY OTHER VARIETY NOT MENTIONED)—COCKERELS. [7 entries.]

I. (£1 10s.)—JOHN FRAYN, *Indian Game.*

II. (15s.)—J. M. STOCKBRIDGE, *Dorking*, hatched January 2nd.

III. (5s.)—R. PARKHOUSE, *Indian Game*, 5 m.

H. C.—J. HARRIS, *Dorking*, 3½ m. :—D. T. WILLIAMS, *Indian Game.*

CLASS 60.—CHICKENS OF 1892 (DORKING, GAME, MALAY, INDIAN GAME, OR ANY OTHER VARIETY NOT MENTIONED)—PULLETS. [7 entries.]

I. (£1 10s.)—JOHN FRAYN, *Indian Game.*

II. (15s.)—JAMES FRAYNE, *Indian Game*, hatched January 5th, 1892.

III. (5s.)—R. B. CURTEIS, hatched 1892.

H. C.—J. HARRIS, *Dorking*, 3½ m. :—W. E. and E. J. MARSHALL, *Indian Game*, 23 w. :—R. PARKHOUSE, *Indian Game*, 5 m. :—J. M. STOCKBRIDGE, *Dorking*, hatched January 22nd.

CLASS 61.—CHICKENS OF 1892—(EITHER PURE-BRED OR CROSS-BRED)—TWO COCKERELS. [3 entries.]

I. (£1 10s.)—JOHN FRAYN, *Indian Game*, 1892.

II. (15s.)—R. ARTHUR, *Indian Game*, 10 w., 2d.

III. (5s.)—R. ARTHUR, *Langshan-Indian Game*, 10 w., 2 d.

CLASS 62.—CHICKENS OF 1892—(EITHER PURE-BRED OR CROSS-BRED)—TWO PULLETS. [6 entries.]

I. (£1 10s.)—JAMES FRAYNE, *Indian Game*, hatched Jan. 5th, 1892.

II. (15s.)—R. B. CURTEIS, *Dorking*, hatched 1892.

III. (5s.)—Miss M. DOLBEN, 4 m., 3 w.

H. C.—Miss V. M. JEANES, *Indian Game-Dorking*, 4 m., 3 w.

Selling Classes.

CLASS 63.*—ANY DISTINCT BREED (PRICE NOT TO EXCEED £1 1s.)—COCKS. [12 entries.]

I. (£1 10s.)—C. W. BRIERLEY.

II. (15s.)—G. COLLINS, *Pile*, in 3rd y.

III. (5s.)—G. T. WHITFIELD, *Golden Wyandotte.*

---

* Given by the Swansea Local Committee.

V. H. C.—W. H. Stoyel, *Minorca*, 13 m.:—S. W. Thomas, over 1 y.

H. C.—J. H. Davis, *Orpington*, 14 m.:—W. L. Langley, *Partridge chin*, 2 y.:—A. G. Phillips, *Langshan*, 13 m.

Class 64.*—ANY DISTINCT BREED (Price not to exceed £1 1s.)—HENS. [14 entries.]

I. (£1 10s.)—J. Woods, 2 y.

II. (15s.)—J. H. Davis, *Partridge Cochin*, 14 m.

III. (5s.)—J. Auckland, *Black Spanish.*

V. H. C.—S. W. Thomas, over 1 y.

H. C.—A. Ashton:—C. W. Brierley:—P. Dear, *Partridge Cochin*, y., 4 m.:—W. Snell, *Minorca*:—and S. W. Thomas, over 1 y.

Class 65.*—ANY DISTINCT BREED, COCK AND HEN (Price not to exceed 30s.) [6 entries.]

I. (£1 10s.)—S. W. Thomas, various.

II. (15s.)—A. G. Phillips, 13 m.

III. (5s.)—G. T. Whitfield, *golden Wyandotte.*

H. C.—Miss M. Benson, *Indian Game*, 1 y., 1 m.:—J. Thomas, 13 m.

Section IV.—DUCKS, GEESE, AND TURKEYS.

Class 66.—DRAKE OR DUCK (Rouen or Aylesbury). [6 entries.]

I. (£1 10s.)—S. Brown, *Rouen*, 1 y., 3 m.

II. (15s.)—S. Brown, *Aylesbury*, 1 y., 4 m.

III. (5s.)—A. G. Phillips, *Rouen.*

H. C.—W. Weston, *Aylesbury.*

Class 67.—DRAKE OR DUCK (Pekin). [7 entries.]

I. (£1 10s.)—A. G. Phillips.

II. (15s.)—H. Withers, 2 y.

III. (5s.)—A. G. Phillips.

V. H. C.—T. Allen.

H. C.—S. Brown, 1 y., 2 m. (twice).

Class 68.—COUPLE OF DUCKLINGS (any Pure or Cross-Bred Variety). [5 entries.]

I. (£1 10s.)—S. Brown, 10 w.

II. (15s.)—A. G. Phillips, *Pekins*, 10 w.

III. (5s.)—E. Knowles, *Aylesbury*, 11 w.

H. C.—T. Allen:—and W. Weston, 1892.

---

* Given by the Swansea Local Committee.

CLASS 69.—GANDER OR GOOSE (ANY VARIETY). [2 entries.]

I. (£1 10s.)—Mrs. A. BAYLDON, *Toulouse*, 2 y.

II. (15s.)—W. E. DAINTON, *Toulouse*, 2 y.

CLASS 70.—TURKEYS (COCK OR HEN). [3 entries.]

I. (£1 10s.)—D. T. ARMES, *bronze*.

II. (15s.)—T. PENRICE, 1 y., 11 m.

Selling Class.

CLASS 71.*—PAIR OF DUCKS (PRICE NOT TO EXCEED 25s.). [3 entries.]

I. (£1 10s.)—J. H. DAVIS, *Pekins*, 14 m.

II. (15s.)—T. ALLEN.

III. (5s.)—H. WITHERS, 1 y.

SECTION V.—**FANCY BREEDS.**

CLASS 72.—BANTAM (BLACK OR WHITE) COCKS. [6 entries.]

I. (£1.)—J. RAWNSLEY, *black*.

II. (10s.)—F. MITCHELL.

III. (5s.)—Rev. G. T. LAYCOCK, *black*.

H. C.—H. HOPKINS, *black*, 13 m.:—and J. PETTIPHER, over 1 y.

CLASS 73.—BANTAM (BLACK OR WHITE) HENS. [12 entries.]

I. (£1.)—H. HOPKINS, *black*, 2 y.

II. (10s.)—O. E. CRESSWELL, *white*, over 1 y.

III. (5s.)—W. BIRCHALL, *black*, 1 y.

V. H. C.—Rev. H. J. CROCKFORD, *black*, over 1 y.:—H. PICKLES, *black*.

H. C.—A. E. MORGAN, *black*, 14 m.:—and J. RAWNSLEY, *black*.

CLASS 74.—BANTAM (GAME, ANY VARIETY) COCKS. [9 entries.]

1. (£1.)—J. WEAVER, 1891.

II. (10s.)—J. W. MAYO, *black red*, 18 m.

III. (5s.)—Mrs. R. Y. ARDAGH, *black red*, 14 m.

V. H. C.—MASLEN and COOPER, *black red*, 11 m.:—R. WINSTONE, *black red*, 2 y.

CLASS 75.—BANTAM (GAME, ANY VARIETY) HENS. [7 entries.]

I. (£1.)—E. CORKE, *black red*, 1891.

II. (10s.)—J. W. MAYO, *black red*, 18 m.

III. (5s.)—G. J. ROSSER, 10 m.

V. H. C.—T. HENRY, 3 y.:—W. MOODY, *Pile*, 12 m.

H. C.—J. W. MAYO, *black red*, 18 m.

---

* Given by the Swansea Local Committee.

376.—BANTAM (ANY OTHER DISTINCT VARIETY) COCKS. [4 entries.]

(£1.)—H. PICKLES, *Sebright.*

(10s.)—O. E. CRESSWELL, *Japanese*, over 1 y.

L. (5s.)—J. RAWNSLEY.

C.—O. E. CRESSWELL, *Japanese*, over 1 y.

377.—BANTAM (ANY OTHER DISTINCT VARIETY) HENS. [5 entries.]

(£1.)—H. PICKLES, *Sebright.*

(10s.)—O. E. CRESSWELL, *Japanese*, over 1 y.

L. (5s.)—O. E. CRESSWELL, *Japanese*, over 1 y.

C.—J. RAWNSLEY.

Bath and West and Southern Counties Society,

FOR THE

Encouragement of Agriculture, Arts, Manufactures, and Commerce.

(ESTABLISHED 1777.)

TERMS OF MEMBERSHIP.

Annual Subscriptions.

Governors, who are eligible for election as President or Vice-President, not less than . 2*l.*
Ordinary Members, not less than . . . 1*l.*
Tenant Farmers, the rateable value of whose holdings does not exceed 200*l.* a-year, not less than 10*s.*

Life Compositions.

Governors may compound for their Subscriptions for future years by payment, in advance, of 20*l.*; and Members by payment, in advance, of 10*l.*

Governors and Members who have subscribed for not less than 20 years may become Life Members on payment of half these amounts.

Any person desirous of joining the Society can be proposed by a Member, or by the Secretary (THOS. F. PLOWMAN, 4, Terrace Walk, Bath).

SUMMARY OF PRIVILEGES.

Governors and Ordinary Members.

1. To receive the Society's Annual 'Journal' free of expense. (See page lv.)
2. To obtain opinions and analyses with regard to **Manures**, Soils, Feeding Stuffs, &c., at **very low rates. (See** page lvii.)
3. To obtain reports and results of **examinations of Seeds** and Plants at very low rates. **(See page lvi.)**

*4. To make an unlimited number of Stock and other Entries at the Society's Annual Exhibitions at reduced fees. (See page lvi.)

5. To be admitted free during *the whole time* of the Annual Exhibition, and to the reserved seats in the Grand Stand, the Working Dairy, and the Military Band Enclosure. (See page lvi.)

6. To use the Special Pavilion for Reading, Writing, &c., provided for Governors and Members attending the Annual Exhibitions.

7. To take part in the Society's Experiments on Crops, &c., and to receive reports thereon. (See page lvi.)

8. To be admitted free to witness the Teaching and Competitions at any of the Society's Dairy Schools. (See page lvii.)

10*s.* *Members.*

Members subscribing less than 1*l.* are entitled to all the above-named privileges except No. 4, and in the case of No. 5, the Ticket is available for *one day only* instead of for the whole time of the Exhibition.

Governors' Special Privileges.

Governors are entitled, in addition to the privileges already mentioned, to an Extra Season Ticket for the Annual Exhibition and for the Reserved Seats in the Grand Stand, the Working Dairy, and the Military Band Enclosure. Governors subscribing more than 2*l.* are entitled to a further Ticket for every additional 1*l.* subscribed.

THE SOCIETY'S OPERATIONS.

The Journal.

The 'Journal,' which is published annually, bound in cloth, has for its aim the dissemination of Agricultural knowledge in a popular form, and affords a medium for recording and discussing the chief topics of interest in this direction which have been ventilated during the year. In addition to original articles by well-known agricultural authorities, it contains Reports on the Live Stock, Implements, &c., exhibited at the Society's Shows, particulars of the Society's general operations, prize awards, financial statements, lists of Members, reviews of new books on Agriculture, &c. (The price of the 'Journal' to non-Members is 6*s.* 5*d.*, post free.)

* This privilege is confined to Governors or Members elected on or before the last Tuesday in January preceding the Show.

Annual Exhibitions.

The Society's Exhibitions are held annually in one of the centres of the various districts included in the Society's area of operations.

Prizes to a large amount are given for Horses, Cattle, Sheep, Pigs, Dairy Produce, &c.

Entries can be made by Members (elected on or before the last Tuesday in January preceding the Show) at 10*s*. per entry for Horses, and 5*s*. per entry for Cattle, Sheep, and Pigs. Non-Members are required to pay 1*l*. per entry for Horses and 15*s*. per entry for the other Stock named.

Provision is also made for the exhibition of Agricultural Implements and Machinery, Seeds, Cattle Foods, Artificial Manures, and articles of general utility. An entry fee, in addition to the charge for space, is payable by Non-Members.

A substantially-built and completely-equipped Working Dairy on a large scale is a special feature of the Annual Exhibitions. Here lectures, discussions, explanatory demonstrations, and comparative tests of implements and processes are carried on with the assistance of well-known practical and scientific experts. On each day of the Exhibition Butter-making Competitions for valuable prizes are held for farmers' wives and daughters, and dairymen and women.

Among other features of the Annual Meeting are Horse Shoeing Competitions, Poultry and Horticultural Shows, and Exhibitions illustrative of Bee-keeping, Home Industries, Art Manufactures, and the Fine Arts.

Experiments.

Experiments on crops are conducted at experimental stations in various parts of the kingdom, the results of which are published in the Society's 'Journal.' The special objects of this department are:—

a. To test the advantages, or otherwise, of the use of artificial manures, on corn, grass and roots, on land in ordinary farming condition, based on the results obtained from the Rothamsted and Woburn Experiments.

b. To examine, test, and exhibit any new processes for dealing with agricultural produce which appear likely to be beneficial.

c. To collect and publish information on new systems of cultivation, routine of crops, or other efforts which are being made for the profitable cultivation of land under low prices of corn.

The Society has also an Experimental section in connection ith its Cheese School, to which is attached a laboratory. .ere systematic investigations are conducted by a scientific aff, acting in conjunction with practical experts. Detailed ports of these investigations are given in the Society's Journal.'

Technical Education.

With a view to promoting Technical Education in Agricul-ure, and in Dairying especially, the Society undertakes (as far s its arrangements will permit) to provide travelling Butter chools fully equipped with competent teachers, plant, &c., for ublic bodies within its area of operations. At the present time he Society is conducting Schools for three County Councils, nd daily instruction is given to Students in them.

The Society has also a fixed Cheese School in Somerset, here Students are received and boarded.

Both the Butter and Cheese Schools are under the inspection f the Board of Agriculture, which has shown its appreciation f the work carried on at them by substantial grants in aid.

Fine Art and Art-Manufactures.

One of the objects for which the Society was founded was the ncouragement of Arts as well as Agriculture, and, to this end, n exhibition of Paintings and Art-Manufactures is annually eld in Galleries erected in the Society's Show Yard.

The special aims of the Society in maintaining this depart-nent are:—

1st. The encouragement of young artists, especially, and of local efforts to bring art-workmanship to bear in the production of decorative or useful articles.

2nd. The exhibition of such art treasures as there may be in private or other collections, to which the public ordinarily have no access.

No charge is made to Artists for the exhibition of their aintings, and, in order to promote the sale of meritorious orks, an Art Union is held, the prizes for which are selected rom the Pictures exhibited, a large sum being annually voted y the Society towards their purchase.

THOS. F. PLOWMAN,

, Terrace Walk, Bath. Secretary and Editor.

Telegraphic Address, "Plowman," Bath.

Bath and West and Southern Counties Society.

GENERAL LAWS.

"I. The Society shall consist of a President, Vice-Presidents, Council, Treasurer, Secretary, Governors, and Members, and shall have the following objects:—

"1st. To hold meetings in the West and South of England for the exhibition of breeding stock, agricultural implements, and such other articles connected with agriculture, arts, manufactures, or commerce, as may be determined upon by the Council.

"2nd. To offer premiums for essays and reports on subjects affecting agriculture, and to publish a Journal for circulation.

"II. The West of England shall be divided into two districts, to be called the Eastern and Western, and the boundary line separating Devon from Somerset and Dorset shall be the division of such districts; and the following counties, viz., Hants, Berks, Oxford, Surrey, Sussex, and Kent, shall form a third district, to be called the Southern.

"III. The Council shall consist of a president, vice-presidents, and sixty-six other members (thirty-three of whom shall retire annually by rotation, but shall be eligible for re-election), and shall be elected by the whole body of members. Eighteen members of the Council shall be chosen from persons residing or representing property in the Eastern District, eighteen from persons residing or representing property in the Western District, eighteen from persons residing or representing property in the Southern District, and the remaining twelve may be elected from the general body of members, without reference to districts.

"IV. The election of President and Council shall take place at the annual meeting; and they shall enter into office at the conclusion of the annual meeting at which they have been chosen. The Council shall have power to nominate Vice-Presidents, and fill up such vacancies as are left after the annual meeting, and in their own body, as may from time to time occur during the interval between the annual meetings.

"V. The entire management of the Society, including the power of making bye-laws, of settling the prizes to be awarded, of nominating the committees, fixing the places of meetings, of appointing or removing the Treasurer, Secretary, and such other officers as may be required to carry on the business of this Society, shall be vested in the Council, who shall report their proceedings at the annual meeting.

"VI. The meetings for exhibitions shall be held in different towns in successive years.

"VII. A subscriber of 1*l.* and upwards annually shall be a member entitled to all the privileges of the Society; of 2*l.*, a governor, and eligible for election as a vice-president; and a tenant-farmer, the rateable value of whose holding does not exceed 200*l.* a year, shall, by subscribing 10*s.* and upwards annually, also be a member of the Society, without the privilege of exhibiting at reduced fees (see Law IX.). Each member shall be liable to pay his subscription, until he shall have given notice, in writing, to the Secretary of his intention to withdraw. The subscriptions to become due and be paid in advance on the 1st of January in each year. All firms of two or more persons shall subscribe not less than 1*l.* annually.

"VIII. The payment of 10*l.* in one sum shall constitute a member for life, and of 20*l.* in one sum a governor for life; but any member, who has subscribed not less than 1*l.* annually for a period of twenty years and upwards, may become a life member on the further payment of 5*l.* in one sum; and any governor, who has subscribed not less than 2*l.* annually for the same period, may become a life governor on the further payment of 10*l.* in one sum.

"IX. To entitle a member to exhibit, he must have been a member for three months, and have paid his subscription, of not less than 1*l.* for the current year, at least one month previous to the closing of the entries. Members subscribing less than 1*l.*, and non-members, will be permitted to exhibit stock, agricultural implements, or other articles, on payment of such a sum as the Council shall direct.

"X. The Annual Meetings of the Society shall be held in the months of May or June. Special General Meetings may be convened by the President on the written requisition of not less than three members of Council, all members of the Society having fourteen days' notice of the object for which they are called together. At such Annual or Special General Meetings no member of less than three months' standing, or whose subscription is in arrear, shall be entitled to a vote.

"XI. If it be proved, to the satisfaction of the Council, that any person has attempted to gain a prize in this, or any Agricultural Society, by a false Certificate, or by a misrepresentation of any kind, such person shall thereupon be excluded from again exhibiting in this Society.

"XII. All prizes shall be open for competition to the United Kingdom. But no exhibitor of stock, or person intending to compete for any of the Society's prizes, shall be privy to the selection of judges to award the premiums.

"XIII. The proceedings of the Society, including the Prize Reports and List of Members, shall be printed annually, and every subscriber not in arrear with his subscription shall be entitled to receive one copy, free of expense, and there shall be an additional number printed for sale.

"XIV. No new general rule shall be proposed, or existing one altered or rescinded, excepting at an Annual or Special General Meeting, and then only provided a statement in writing shall have been sent to the Secretary at least twenty-one days previously, setting forth the rule to be proposed, rescinded, or altered; and in the last case tho proposed alteration shall be stated.

"XV. No subject or question of a political tendency shall ever be introduced at any meeting of this Society."

List of Officers.

1892–93.

GLOUCESTER MEETING.

PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

PRESIDENT FOR 1892–93.

E RIGHT HON. THE LORD FITZHARDINGE, Berkeley Castle, Gloucestershire.

TRUSTEES.

*ACLAND, THE RIGHT HON. SIR THOMAS DYKE, Bart., Killerton, Exeter.
PAGET, SIR RICHARD HORNER, Bart., M.P., Cranmore Hall, Shepton Mallet.
LENNARD, SIR JOHN FARNABY, Bart., Wickham Court, West Wickham, Kent.

VICE-PRESIDENTS.

*ABERGAVENNY, MARQUESS OF, K.G.	Eridge Castle, Tunbridge Wells
*ACLAND, RIGHT HON. SIR T. D., Bart.	Killerton, Exeter
*AMHERST, EARL	Montreal, Sevenoaks, Kent
BARNETT, H.	Glympton Park, Woodstock
*BATH, MARQUESS OF	Longleat, Warminster
BELFIELD, JOHN	Primley Hill, Torquay
*BENYON, RICHARD	Englefield House, Reading
*BROOKE, LORD, M.P.	Easton Lodge, Dunmow
BRUCE, W. A.	96, Sydney Place, Bath
BRYMER, W. E., M.P.	Ilsington House, Dorchester
CALTHORPE, LORD	Elvetham Park, Winchfield
*CARLINGFORD, LORD	Chewton Mendip, Somerset
*CLINTON, LORD	Heanton Satchville, Beaford, N. Devon
*CORK AND ORRERY, EARL OF	Marston, Frome
*COVENTRY, EARL OF	Croome Court, Severn Stoke, Worcester
*DARNLEY, EARL OF	Cobham Hall, Gravesend
DAW, R. R. M.	Spurbarne, Exeter
DEVONSHIRE, DUKE OF, K.G.	Chatsworth, Derbyshire
DIGBY, G. D. W.	Sherborne Castle, Sherborne
*DUCIE, EARL OF	Tortworth, Falfield, R.S.O.
*FORTESCUE, EARL	Castle Hill, South Molton
GIBBS, A.	Tyntesfield, Bristol
GORING, REV. J.	Wiston Park, Steyning
HIPPESLEY, J. H.	Ston Easton, Somerset
HULSE, SIR E., Bart.	Breamore, Salisbury
*ILCHESTER, EARL OF	Melbury, Dorchester
*JERSEY, EARL OF	Middleton Park, Bicester, Oxon.
KNYFTON, T. TUTTON	Uphill, Weston-super-Mare
*LANSDOWNE, MARQUESS OF	Bowood, Calne
LECONFIELD, LORD	Petworth House, Sussex
LENNARD, SIR J. F., Bart.	Wickham Court, West Wickham, Kent
*LLEWELYN, SIR J. T. D., Bart.	Penllergare, Swansea

*** Those to whose names an asterisk (*) is prefixed have filled the office of President.

VICE-PRESIDENTS—*continued.*

*LOPES, SIR M., Bart.	Marristow, Roborough, S. Devon
LOVELACE, EARL OF	Ashley Combe, Porlock, Somerset
LOYD, LEWIS	Monk's Orchard, Bromley, Kent
LUTTRELL, COL., C.B.	Badgworth Court, Axbridge, Somer
MILDMAY, SIR H. ST. JOHN, Bart.	Dogmersfield Park, Winchfield
MOORE-STEVENS, J. C.	Winscott, Great Torrington
MORETON, LORD.	Sarsden House, Chipping Norton
*MORLEY, EARL OF	Saltram, Plympton, Devon
MORRELL, G. HERBERT	Headington Hill Hall, Oxford
*MOUNT-EDGCUMBE, EARL OF	Mount-Edgcumbe, Devonport
MOYSEY, HENRY GORGES	Bathealton Court, Wiveliscombe
MURCH, JEROM	Cranwells, Bath
NORTHUMBERLAND, DUKE OF	Albany Park, Guildford
PAGET, Sir R. H., Bart., M.P.	Cranmore Hall, Shepton Mallet
PINNEY, W.	Somerton
POLTIMORE, LORD	Poltimore, Exeter [H
PORTAL, MELVILLE	Laverstock House, Micheldeve
RICHMOND, DUKE OF, K.G.	Goodwood Park, Chichester
SAINT GERMANS, EARL OF	Port Elliot, Devonport
STORY-MASKELYNE, N.	Basset Down House, Swindon
STUCLEY, SIR G. S., Bart.	Moreton, Bideford, N. Devon
*TEMPLE, EARL	Newton Park, Bath.
THYNNE, LORD HENRY	Muntham, Worthing
*TREDEGAR, LORD	Tredegar Park, Newport, Monm
*TREMAYNE, JOHN	Heligan, St. Austell
TROYTE, COL.	Huntsham Court, Bampton, De
WALTER, JOHN	Bearwood, Wokingham
WEYMOUTH, VISCOUNT	Longleat, Warminster
WINCHESTER, MARQUESS OF	Amport St. Mary's, Andover

THE LORD WARDEN OF THE STANNARIES.
THE SURVEYOR-GENERAL OF THE DUCHY OF CORNWALL.
THE RECEIVER-GENERAL OF THE DUCHY OF CORNWALL.

*** Those to whose names an asterisk (*) is prefixed have filled the office of President.

MEMBERS OF COUNCIL.

EASTERN DIVISION.

Elected in 1891:—

Name.	*Address.*
Bush, R. H.	Ellaston, Atlantic Road South, Weston-s.-Mare
Dyke, Thomas	Long Ashton Lodge, Clifton
Edwards, C. L. F.	The Court, Axbridge, Somerset
Farwell, F. G.	11, Laura Place, Bath
Hood, Sir A. Acland, Bart., M.P.	St. Audries, Bridgwater
Jones, Henry Parr	Portway House, Warminster
Sanford, E. C. A.	Nynehead Court, Wellington, Somerset
Skinner, A. C.	Bishop's Lydeard, Taunton
Sweet, Rev. L. E.	Hullavington, Chippenham

Elected in 1892:—

Name.	*Address.*
Arkwright, J. H.	Hampton Court, Leominster
Danger, Thomas	Rowford Lodge, Taunton
Hobhouse, H., M.P.	Hadspen, Castle Cary.
Knollys, C. R.	Fitzhead Court, Taunton
Maule, M. St. J.	Chapel House, Bath
Napier, H. B.	Chippenham
Neville-Grenville, R.	Butleigh Court, Glastonbury
Sherston, Capt. J. D.	Evercreech, Bath
Williams, E. W.	Herringston, Dorchester

WESTERN DIVISION.

Acland, C. T. D.	Killerton, Exeter
Calmady, V. P.	Tetcott, Holsworthy
Dymond, Francis W.	Bampfylde House, Exeter
Leir, Col. W.	Combe Head, Bampton, Devon
Naper, Col. W. D.	Stanley Lodge, Exmouth
Sanders, E. J.	Stoke House, Exeter
Sillifant, A. O.	Coombe, Copplestone
Trood, Col. R.	Matford, Exeter
Walrond, Sir W. H., Bart., M.P.	New Court, Topsham, Devon

Collins, C. R.	Strathculm, Hele, Cullompton
Ley, J. H.	Trehill, Exeter
Marker, Richard	Combe, Honiton
Newbery, S. P.	Plympton St. Mary, South Devon
Pratt, J. D.	Pratshayes, Exmouth
Shelley, Sir J., Bt.	Shobrooke Park, Crediton
Williams, Sir W. R., Bart.	Heanton, Barnstaple
Wippell, Richard	Rudway, Thorverton
Wyatt-Edgell, Col. Arthur	Cowley House, Exeter

SOUTHERN DIVISION.

Ashcroft, W.	Hayes, Beckenham, Kent
Boteler, Capt. W. J. Casberd	The Elms, Taplow
Cobb, H. M.	Higham, Kent
Cundall, H. M.	Richmond, Surrey
Gill, Frederick	Speenhamland, Newbury
Pain, C.	Longstock, Stockbridge, Hants
Parker, James S.	Freelands, Iffley, Oxford
Seymour, R. A. H.	46, Earl Street, Maidstone
Sutton, Martin J.	Kidmore Grange, Caversham, Oxon

Best, Col. G.	Charlton House, Ludwell, Salisbury
Druce, A. F. M.	Fyfield, Abingdon
Goring, C.	Wiston Park, Steyning, Sussex
Grenfell, Arthur	4, Savile Row, London, W.
Simpson, G.	Wray Park, Reigate
Stanford, A.	Eatons, Steyning
Warre, F.	44, Great Ormond Street, Bloomsbury, London
Whitehead, C., F.L.S.	Barming House, Maidstone
Williams, A. G.	Portsea, Hants

ELECTED WITHOUT REFERENCE TO DISTRICT.

Best, Capt. J. C. (R.N.)	Plas-yn-Vivod, Llangollen
Brown, W. J.	Middlehill House, Box, Wilts
Chorley, W. L.	Quarme, Dunster
Ford, Henry	Lower House, Branscombe, Axminster, Devon
Gibbons, George	Tunley, Bath
Taylor, H. W.	Showle Court, Ledbury

Allen, James D.	Belle Vue House, Evercreech
Llangattock, Baron	The Hendre, Monmouth
Llewellyn, Evan H.	Langford Court, Bristol
Martin, G. E.	Ham Court, Upton-on-Severn
Phillips, C. D.	Newport, Mon.
Skrine, H. D.	Claverton Manor, Bath

EX-OFFICIO MEMBERS.

The Treasurer . . . . . Badcock, Henry Jeffries, Somersetshire Bank, Taunton.

Consulting Surveyor . . Spackman, Henry, 6, Terrace Walk, Bath.

COMMITTEES, 1892–93.

[The PRESIDENT is *ex-officio* Member of all Committees.]

FINANCE.

JONES, H. P., *Chairman.*

COLLINS, C. R. | MARTIN, G. E.

PUBLICATIONS.

ACLAND, RIGHT HON. SIR THOMAS DYKE, Bart., *Chairman.*

ACLAND, C. T. D. | DYMOND, F. W. | MASKELYNE, N. STORY-MARTIN, G. E.

STOCK PRIZE-SHEET.

LENNARD, SIR J. F., Bart., *Chairman.*

ALLEN, J. D.
BEST, COL. G.
BROWN, W. J.
DANGER, T.
DRUCE, A. F. M.
GIBBONS, G.
MARKER, R.
MOORE-STEVENS, J. C.
SANFORD, E. C. A.
SHELLEY, SIR J., Bt.
STANFORD, A.
TROYTE, COL.
WILLIAMS, E. W.

JUDGES' SELECTION.

ALLEN, J. D.
BEST, COL. G.
BROWN, W. J.
CHORLEY, W. L.
DRUCE, A. F. M.
GIBBONS, G.
LENNARD, SIR J. F., Bt.
MOORE-STEVENS, J. C.
SHELLEY, SIR J., Bt.
WILLIAMS, E. W.

IMPLEMENT REGULATIONS.

BEST, CAPT. J. C. (R.N.), *Chairman.*

ACLAND, C. T. D.
BOTELER, CAPT. W. J. C. (R.N.)
DYKE, T.
EDWARDS, C. L. F.
GIBBONS, G.
JONES, H. P.
LLEWELLYN, E. H.
NAPIER, H. B.
NEVILLE-GRENVILLE, R.
SHELLEY, SIR J., Bt.

ALLOTMENT.

BEST, CAPT. J. C. (R.N.)
BOTELER, CAPT. W. J. C.
EDWARDS, C. L. F.
GIBBONS, G.
LLEWELLYN, E. H.
NAPIER, H. B.
NEVILLE-GRENVILLE, R.

RAILWAY ARRANGEMENTS.

BRUCE, W. ADAIR, *Chairman.*

AMHERST, EARL
BUSH, R. H.
CORK, THE EARL OF.
COVENTRY, THE EARL OF.
DRUCE, A. F. M.
ILCHESTER, THE EARL OF
LLANGATTOCK, BARON
LENNARD, SIR J. F., Bt.
LOPES, SIR M., Bart.
MORLEY, THE EARL OF
SHELLEY, SIR J., Bt.

(With power to add to their number.)

DISQUALIFYING.

THE STEWARDS OF HORSES. | THE STEWARDS OF STOCK.
THE STEWARDS OF POULTRY.

CONTRACTS.

BEST, CAPT. J. C. (R.N.), *Chairman.*

BOTELER, CAPT. W. J. C.
EDWARDS, C. L. F.
LLEWELLYN, E. H.
NAPIER, H. B.
NEVILLE-GRENVILLE, R.
SANFORD, E. C. A.

ARTS AND MANUFACTURES.

ACLAND, RIGHT HON. SIR T. D., Bart., *Chairman.*

WYATT-EDGELL, Col. A., *Vice-Chairman.*

ACLAND, C. T. D.
CUNDALL, H. M. (F.S.A.)
DAW, R. R. M.
MOORE-STEVENS, J. C.
MORRELL, G. H.
MURCH, JEROM.
NAPER, Col. W. D.
WILLIAMS, E. W.

(With power to add to their number.)

EXPERIMENTAL.

ACLAND, Right Hon. Sir T. D., Bart., *Chairman.*

ACLAND, C. T. D.
ALLEN, J. D.
ASHCROFT, W.
DYKE, T.
DRUCE, A. F. M.
GIBBONS, G.
JONES, H. P.
KNOLLYS, C. R.
LENNARD, Sir J. F., Bt.
LLEWELLYN, E. H.
MASKELYNE, N. STORY-
NAPIER, H. B.
PAGET, Sir R. H., Bart. (M.P.)
SUTTON, M. J.

(With power to add to their number.)

DAIRY.

ACLAND, C. T. D., *Chairman.*

ACLAND, Rt. Hon. Sir T. D., Bart.
ALLEN, J. D.
EDWARDS, C. L. F.
GIBBONS, G.
KNOLLYS, C. R.
LENNARD, Sir J. F., Bt.
MASKELYNE, N. STORY-
NAPIER, H. B.
NEVILLE-GRENVILLE, R.
PAGET, Sir R. H., Bart. (M.P.)
SANFORD, E. C. A.
WIPPELL, R.

AGRICULTURAL EDUCATION.

PAGET, Sir R. H., Bart., M.P., *Chairman.*

ACLAND, Rt. Hon. Sir T. D., Bart.
ACLAND, C. T. D.
ALLEN, J. D.
AMHERST, EARL.
EDWARDS, C. L. F.
GIBBONS, G.
GORING, Rev. J.
HOBHOUSE, H. (M.P.)
LENNARD, Sir J. F., Bart.
LLEWELLYN, E. H.
MASKELYNE, N. STORY-
SUTTON, M. J.

(With power to add to their number.)

Stewards.

Yard.
BEST, Capt. J. C. (R.N.)
LLEWELLYN, E. H.
EDWARDS, C. L. F.

Assistant Steward.
BOTELER, Capt. J. W. C.

Field.
JONES, H. P. DYKE, T.

Works.
NEVILLE-GRENVILLE, R. NAPIER, H. B.

Horses.
WILLIAMS, E. W. BEST, Col. G.

Stock.
LENNARD, Sir J. F., Bart.
DRUCE, A. F. M. SHELLEY, Sir J., Bt.

Poultry.
SANDERS, E. J.

Arts.
NAPER, Col. CUNDALL, H. M. (F.S.A.)

Horticulture.
LEIR, Lt.-Col. W.

Hops.
WHITEHEAD, C. (F.L.S.)

Experiments.
KNOLLYS, C. R.

Music.
NAPER, Col.

Dairy.
GIBBONS, G.

Dairy Assistant Steward.
KNOLLYS, C. R.

Forage.
BROWN, W. J.

Forage Assistant Steward.
SKINNER, A. C.

Shoeing.
BEST, Col. G.

Church Service.
GIBBONS, G.

Treasurer.
BADCOCK, H. J.

Local Treasurer.
DYMOND, F. W.

Consulting Surveyor.
SPACKMAN, H.

Superintendent of Works.
ROSSITER, J.

Consulting Chemist.
VOELCKER, Dr. J. A. (F.C.S.)

Consulting Botanist.
CARRUTHERS, W. (F.R.S.)

Editor of 'Journal.'
PLOWMAN, THOS. F.

Associate Editor.
LLOYD, F. J. (F.C.S.)

Auditor.
GOODMAN, A. (*Chartered Accountant.*)

Veterinary Inspector.
BROWN, Prof. G. T. (C.B.)

Secretary—PLOWMAN, THOMAS F.

Member's Privileges.

EXAMINATION OF PLANTS AND SEEDS.

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Examination of Plants and Seeds, to state that they do so as Members of the first-named Society.

The Council have arranged for the following rates of charge for the examination, by the Society's Consulting Botanist, of Plants and Seeds for the *bonâ fide* and individual information and benefit of Members of the Society (not being seedsmen). The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.

No.

1.—A report on the purity and germinating power of a sample of seed, stating the sorts and amount of any other seeds found therein .. .. 1*s.*

2.—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention 1*s.*

3.—Report on any disease affecting farm crops .. .. 1*s.*

4.—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value .. .. 5*s.*

N.B.—The Consulting Botanist's Reports on Seeds are furnished to enable Members,—purchasers of seeds and corn for Agricultural or Horticultural purposes,—to test the value of what they buy, and not to be used or made available for advertising or trade purposes.

PURCHASE OF SEEDS.

The purchaser should obtain from the vendor, by invoice or otherwise, a proper designation of the seed he buys, with a guarantee that it contains not more than a specified amount of other seeds, and is free from ergot, or, in the case of clovers, from dodder, and of the percentage of seeds that will germinate.

The germination of cereals, green crops, clover, and timothy grass should be not less than 90 per cent.; of fox-tail not less than 60 per cent.; of other grasses not less than 70 per cent.

The Council strongly recommend that the purchase of prepared mixtures should be avoided, and that the different seeds to be sown should be purchased separately.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES.

I. Seeds.

In sending seed or corn for examination the utmost care must be taken to secure a fair and honest sample. In the case of grass-seeds the sample should be drawn from the centre of the sack or bag, and in all cases from the bulk delivered to the purchaser and not from the purchase sample. When bought by sample, the whole or part of that sample should also be sent.

When it is considered necessary to secure legal evidence, the sample should be taken from the bulk and placed in a sealed bag in the presence of a reliable witness who is acquainted with the identity of the bulk, and care should be taken that the purchased sample and bulk be not tampered with after delivery, or mixed or come in contact with any other sample or stock.

One ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. The exact name under which the seed has been bought should be sent with it.

Grass-seeds should be sent at least FOUR WEEKS, *and clover-seeds* TWO WEEKS *before they are required, and they should not be sown until the report has been received.*

II. Plants.

In collecting specimens of plants, the whole plant should be taken up, and the earth shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

Parcels or letters containing seeds or plants for examination (carriage or postage prepaid) must be addressed to Mr. W. CARRUTHERS, F.R.S., 43, Central Hill, Norwood, London, S.E.

Member's Privileges.

ANALYSES OF MANURES, FEEDING-CAKES, WATERS, SOILS, &c.

(Applicable only to the case of Persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis.)

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Analyses, to state that they do so as Members of the first-named Society.

THE Council have fixed the following rates of Charges for Chemical Analysis to Members of the Society.

These privileges are applicable only when the Analyses are for *bonâ-fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The analyses are given on the understanding that they are required for the individual and sole benefit of the Member applying for them, and must not be used for other persons, or for commercial purposes.

Land or estate agents, bailiffs, and others, when forwarding samples, are required to state the names of those members on whose behalf they apply.

Members are also allowed to send for analysis under these privileges any manures or feeding-stuffs to be used by their outgoing tenants, or which are to be given free of cost to their occupying tenants.

The analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

Members are requested, when applying for an analysis, to quote the number in the subjoined schedule under which they wish it to be made.

The fees for analysis must be sent to the Consulting Chemist at the time of application.

No.		
1.	An opinion of the purity of bone-dust or oil-cake (each sample)	2*s.* 6*d.*
2.	An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged	5*s.*
3.	An analysis of guano; showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
4.	An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged	5*s.*
5.	An analysis of superphosphate of lime, dissolved bones, &c., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime, and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
6.	An analysis of bone-dust, or any other ordinary artificial manure, together with an opinion as to whether it be worth the price charged	10*s.*
7.	An analysis of compound artificial manures, animal products, refuse substances used for manures, &c.	from 10*s.* to £1
8.	An analysis of limestone, showing the proportion of lime	7*s.* 6*d.*
9.	An analysis of limestone, showing the proportion of lime and magnesia	10*s.*
10.	An analysis of limestone or marls, showing the proportion of carbonate, phosphate, and sulphate of lime and magnesia, with sand and clay	10*s.*
11.	Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime	10*s.*
12.	Complete analysis of a soil	£3
13.	An analysis of oil-cake or other substance used for feeding purposes, showing the proportion of moisture, oil, mineral matter, albuminous matter, and woody fibre, as well as of starch, gum, and sugar in the aggregate; and an opinion of its feeding and fattening or milk-producing properties	10*s.*
14.	Analysis of any vegetable product	10*s.*
15.	Determination of the "hardness" of a sample of water before and after boiling	5*s.*
16.	Analysis of water of land-drainage, and of water used for irrigation	£1
17.	Analysis of water used for domestic purposes	£1 10*s.*
18.	An analysis of milk (to assist Members in the management of their Dairies and Herds, *bonâ fide* for their own information and not for trade purposes, nor for use in connection with the Sale of Food and Drugs Acts)	5*s.*
19.	Personal consultation with the Consulting Chemist. (To prevent disappointment it is suggested that Members desiring to hold a consultation with the Consulting Chemist should write to make an appointment)	5*s.*
20.	Consultation by letter	5*s.*
21.	Consultation necessitating the writing of three or more letters	10*s.*

Members wishing to exercise their privileges on the above-named terms, should forward their samples for examination *by parcel, prepaid*, to the Consulting Chemist, DR. JOHN AUGUSTUS VOELCKER, F.C.S., 22, Tudor Street, New Bridge Street, London, E.C.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES FOR ANALYSIS.

ARTIFICIAL MANURES.—Take a large handful of the manure from three or four bags, mix the whole on a large sheet of paper, breaking down with the hand any lumps present, and fold up in tinfoil, or in oil-silk, about 3 oz. of the well-mixed sample; or place the mixed manure in a small wooden or tin box, and send it by post. If the manure be very wet and lumpy, a large boxful, weighing from 10 to 12 oz., should be sent either by post or railway.

Samples weighing less than ½ lb. should be sent by letter post; samples above that weight can be most cheaply forwarded by parcel post.

The parcels should be addressed: Dr. J. Augustus Voelcker, 22, Tudor Street, New Bridge Street, London, E.C.

OILCAKES.—Take a sample from the middle of the cake. To this end break a whole cake into two. Then break off a piece from the end where the two halves were joined together, and wrap it in paper, and send by parcel post. The piece should weigh at least from 10 to 12 oz. If sent by railway, one quarter or half a cake should be forwarded, carriage prepaid.

FEEDING MEALS.—About 3 oz. will be sufficient for analysis. Enclose the meal in a small linen bag. Send it by post.

SOILS.—Have a wooden box made 6 inches long and wide, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil with its subsoil 9 to 12 inches deep; trim this block or plan of the field to make it fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up, gently turn over the box, nail on the lid, and send it by goods or parcel train to the Laboratory. The soil will then be received in the exact position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil and forced down by pressure, and then dug out.

WATERS.—The water, if possible, should be sent in a glass-stoppered Winchester half-gallon bottle, which is readily obtained at any chemist and druggist's shop. If Winchester bottles cannot be procured, the water may be sent in perfectly clean new stoneware spirit-jars, surrounded by wicker-work. For the determination of the degree of hardness before and after boiling, only one quart wine-bottle full of water is required.

LIMESTONES, MARLS, &c.—Whole pieces, weighing from 3 to 4 oz., should be sent enclosed in small linen bags, or wrapped in paper.

On forwarding samples, separate letters should be sent to the Laboratory specifying the nature of the information required, and, if possible, the object in view.

GUIDE TO THE PURCHASE OF ARTIFICIAL MANURES AND FEEDING STUFFS.

Feeding Cakes.

1. *Linseed-cake* should be purchased as "Pure," and the insertion of this word on the invoice should be insisted upon. The use of such words as "Best," "Genuine," &c., should be objected to by the purchaser.

2. *Rape-cake for feeding purposes* should be guaranteed "Pure," and purchased by sample.

3. *Decorticated Cotton-cake* should be guaranteed "Pure," and purchased by sample.

4. *Undecorticated Cotton-cake* should be guaranteed "Pure," and purchased by sample.

N.B.—All feeding cakes should be purchased in good condition, and the guarantee of the vendor should be immediately checked by a fair sample (taken out of the middle of the cake) being at once sent for examination to a competent analytical chemist. The remainder of the cake from which the sample sent for examination had been taken should be sealed up in the presence of a witness, and retained by the purchaser for reference in case of dispute.

Artificial Manures.

1. *Raw or Green Bones or Bone-dust* should be purchased as "Pure" Raw Bones guaranteed to contain from 45 to 48 per cent. of tribasic phosphate of lime, and to yield not less than 4 per cent. of ammonia.

2. *Boiled Bones* should be purchased as "Pure" Boiled Bones guaranteed to contain from 55 to 60 per cent. of tribasic phosphate of lime, and to yield not less than 1 per cent. of ammonia.

3. *Dissolved Bones* are made of various qualities, and are sold at various prices per ton; therefore the quality should be guaranteed under the heads of *soluble* phosphate of lime, *insoluble* phosphate of lime, and nitrogen, or its equivalent of ammonia. The purchaser should also stipulate for an allowance for each unit per cent. which the dissolved bones should be found on analysis to contain less than the guaranteed percentages of the three substances already mentioned.

4. *Mineral Superphosphates* should be guaranteed to be delivered in a sufficiently dry and powdery condition, and to contain a certain percentage of *soluble* phosphate of lime, at a certain price per unit per cent., no value to be attached to *insoluble* phosphates.

5. *Compound Artificial Manures* should be purchased in the same manner and with the same guarantees as Dissolved Bones.

6. *Nitrate of Soda* should be guaranteed by the vendor to contain 95 per cent. of pure nitrate.

7. *Sulphate of Ammonia* should be guaranteed by the vendor to contain not less than 24 per cent. of ammonia.

8. *Peruvian Guano* should be sold under that name, and guaranteed to be in a dry and friable condition, and to contain a certain percentage of ammonia.

N.B.—Artificial manures should be guaranteed to be delivered in a sufficiently dry and powdery condition to admit of distribution by the drill. A sample of analysis should be taken, not later than three days after delivery, by emptying several bags, mixing the contents together, and filling two tins holding about half a pound each, in the presence of a witness. Both the tins should be sealed, one kept by the purchaser for reference in case of dispute, and the other forwarded to a competent analytical chemist for examination.

GLOUCESTER MEETING,

WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, AND MONDAY,

MAY 31, AND JUNE, 1, 2, 3, AND 5, 1893.

MONEY PRIZES.

	£	s.	d.	Page
HORSES	650	0	0	.. lxx
CATTLE	1,277	0	0	.. lxxi
SHEEP	573	0	0	.. lxxiv
PIGS	280	0	0	.. lxxvi
CHEESE	141	0	0	.. lxxvii
BUTTER	59	0	0	.. lxxviii
BUTTER-MAKING	60	10	0	.. lxxix
HORSE-SHOEING	22	0	0	.. lxxx
POULTRY	193	0	0	.. lxxxvii
Total	£3,255	10	0	

The above Prizes are given in the following proportions:—

	£	s.	d.
By the Society	2,836	10	0
„ Gloucester Local Committee	400	0	0
„ English Jersey Cattle Society	9	0	0
„ Shropshire Sheep Breeders' Association	10	0	0
	£3,255	10	0

MEDALS AND PLATE.

In addition to the above Prizes, there are offered:—

A GOLD MEDAL, in the Shire Horse Classes, by the Shire Horse Society.

A GOLD MEDAL, or BRONZE MEDAL and 5*l*., in the Hunter Classes, by the Hunters' Improvement Society.

A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter Test Class, by the English Jersey Cattle Society.

TWO SILVER CUPS, in the Guernsey Classes, by the English Guernsey Cattle Society.

A GOLD MEDAL for a Milking Machine, by the Society.

A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter-making Classes, by the Society.

PRIZES.

[This Prize-Sheet is subject to any Orders that may be issued by the Board of Agriculture.]

xcept where otherwise stated, all Prizes are open without restriction to County.

HORSES.	First Prize.	Second Prize.	Third Prize.
n Animal cannot be entered in more than one Class.	£	£	£
SHIRE.			
ligible for the Shire Horse Society's Stud Book.)			
ss			
.—STALLION, foaled before 1891	20	10	5
.—STALLION, foaled in 1891	15	10	5
.—MARE and FOAL, or in-FOAL	20	10	5
.—FILLY, foaled in 1890	10	5	3
.—FILLY, foaled in 1891	10	5	3
SPECIAL PRIZES.			
ffered by the Gloucester Local Committee, and open only to Residents in the County of Gloucester.			
Best Entry in Classes 1 or 2	**20**		
" " Class 3	**10**		
" " Classes 4 or 5	**10**		
Offered by the Shire Horse Society, for Best MARE or FILLY in Classes 3, 4, or 5 (see Special Conditions 32a on page lxxxiv) a Gold Medal, value	**10**		
NY OTHER AGRICULTURAL BREED.			
.—STALLION, foaled before 1891	20	10	5
.—STALLION, foaled in 1891	15	10	5
.—MARE and FOAL, or in-FOAL	20	10	5
.—FILLY, foaled in 1890	10	5	3
.—Filly, foaled in 1891	10	5	3
SPECIAL PRIZES.			
ffered by the Gloucester Local Committee, and open only to Residents in the County of Gloucester.			
Best entry in Classes 6 or 7	**20**		
" " Class 8	**10**		
" " Classes 9 or 10	**10**		
HUNTERS.			
he Prizes in Class 11 are offered by the Gloucester Local Committee.)			
.—Thoroughbred Stallion, travelling in the County of Gloucester	**25**	**10**	**5**
.—MARE or GELDING, foaled in 1889	20	10	5
.—FILLY or GELDING, foaled in 1890	15	5	3
.—FILLY or GELDING, foaled in 1891	15	5	3
.—FILLY or COLT, foaled in 1892	15	5	3
.—MARE and FOAL, or in-FOAL	25	10	5

HORSES—*continued.*	First Prize.	Second Prize.	Third Prize.
SPECIAL PRIZES.	£	£	£
Offered by the Gloucester Local Committee, and open only to Residents in the County of Gloucester.			
Best Entry in Classes 12 or 13 . . .	**10**		
„ „ Classes 14 or 15 . . .	**10**		
„ „ Class 16	**10**		
Offered by the Hunters' Improvement Society for the Best BROOD MARE in-FOAL to, or having bred a Foal to, a Thorough-bred Horse, provided such Mare is a Prize-winner, or is Reserved, in Class 16, and has not previously won the Hunters' Improvement Society's Medal or Premium, as a Brood Mare, a Gold Medal, value	**10**		
(Or a Bronze Medal and £5, at the option of the Winner.)			
CLASS **HACKS.**			
17.—MARE or GELDING, over 14 hands . . .	10	5	3
18.—MARE or GELDING, not over 14 hands . .	10	5	3
PONIES.			
19.—MARE or GELDING, not over 13 hands . .	7	3	2
HARNESS.			
20.—MARE or GELDING, over 14 hands and not over 15·2	10	5	3
21.—MARE or GELDING, not over 14 hands . .	10	5	3

CATTLE.

An Animal cannot be entered in more than one Class.

	First Prize.	Second Prize.	Third Prize.
DEVON.			
22.—BULL, calved in 1889 or 1890	15	10	5
23.—BULL, calved in 1891	15	10	5
24.—BULL, calved in 1892	15	10	3
25.—COW, in-Milk or in-Calf, calved before 1890 .	15	10	3
26.—HEIFER, in-Milk or in-Calf, calved in 1890 .	15	10	[illegible]
27.—HEIFER, calved in 1891	10	5	[illegible]
28.—HEIFER, calved in 1892	10	5	
SHORTHORN.			
29.—BULL, calved in 1889 or 1890	15	10	
30.—BULL, calved in 1891	15	10	
31.—BULL, calved in 1892	15	10	
32.—COW, in-Milk or in-Calf, calved before 1890 .	15	10	
33.—HEIFER, in-Milk or in-Calf, calved in 1890 .	15	10	
34.—HEIFER, calved in 1891	10	5	
35.—HEIFER, calved in 1892	10	5	

CATTLE—*continued.*	First Prize.	Second Prize.	Third Prize.
	£	£	£
CHAMPION PRIZES.			
(Offered by the Gloucester Local Committee.)			
Best Shorthorn Bull in any of the Classes	10		
Best Shorthorn Cow or Heifer in any of the Classes	10		
CLASS **HEREFORD.**			
36.—BULL, calved in 1889 or 1890	15	10	5
37.—BULL, calved in 1891	15	10	5
38.—BULL, calved in 1892	15	10	3
39.—COW, in-Milk or in-Calf, calved before 1890	15	10	3
40.—HEIFER, in-Milk or in-Calf, calved in 1890	15	10	3
41.—HEIFER, calved in 1891	10	5	3
42.—HEIFER, calved in 1892	10	5	3
SUSSEX.			
43.—BULL, calved in 1889 or 1890	15	10	5
44.—BULL, calved in 1891	15	10	5
45.—BULL, calved in 1892	15	10	3
46.—COW, in-Milk or in-Calf, calved before 1890	15	10	3
47.—HEIFER, in-Milk or in-Calf, calved in 1890	15	10	3
48.—HEIFER, calved in 1891	10	5	3
49.—HEIFER, calved in 1892	10	5	3
JERSEY.			
50.—BULL, calved in 1889 or 1890	15	10	5
51.—BULL, calved in 1891	15	10	5
52.—BULL, calved in 1892	15	10	3
53.—COW in-Milk or in-Calf, calved before 1890	15	10	3
54.—HEIFER, in-Milk or in-Calf, calved in 1890	15	10	3
55.—HEIFER, calved in 1891	10	5	3
56.—HEIFER, calved in 1892	10	5	3
CHAMPION PRIZES.			
(Offered by the Gloucester Local Committee.)			
Best Jersey Bull in any of the Classes	10		
Best Jersey Cow or Heifer in any of the Classes	10		
BUTTER TEST PRIZES.			
(Offered by the English Jersey Cattle Society.)			
Cow or Heifer in the Jersey Classes, eligible for the English Jersey Herd Book, yielding the largest quantity of Butter by the practical Test of the Separator and Churn.			
1st Prize, Gold Medal and	3		
2nd ,, Silver Medal and		3	
3rd ,, Bronze Medal and			3

CATTLE—*continued.*	First Prize.	Second Prize.	Third Prize.
CLASS **GUERNSEY.**	£	£	£
57.—BULL, calved in 1889 or 1890	15	10	5
58.—BULL, calved in 1891	15	10	5
59.—BULL, calved in 1892	15	10	3
60.—Cow, in-Milk or in-Calf, calved before 1890	15	10	3
61.—HEIFER, in-Milk or in-Calf, calved in 1890	15	10	3
62.—HEIFER, calved in 1891	10	5	3
63.—HEIFER, calved in 1892	10	5	3
CHAMPION PRIZES.			
(Offered by the Gloucester Local Committee.)			
Best Guernsey Bull in any of the Classes	**10**		
Best Guernsey Cow or Heifer in any of the Classes	**10**		
SPECIAL PRIZES.			
(Offered by the English Guernsey Cattle Society.)			
Best Pair of Guernsey Cows in any of the Classes, Silver Cup, value	**5**		
Best Pair of Guernsey Heifers in any of the Classes, Silver Cup, value	**5**		
KERRY.			
64.—BULL, calved in 1890, 1891, or 1892	10	5	2
65.—Cow or HEIFER, in-Milk or in-Calf, of any age	10	5	2
DEXTER KERRY.			
66.—BULL, calved in 1890, 1891, or 1892	10	5	2
67.—Cow or HEIFER, in-Milk or in-Calf, of any age	10	5	2
ANY BREED OR CROSS.			
In Classes 68, 69, *and* 70, *the quantity and quality of the milk and the date of last calving will be taken into consideration.*			
Offered by the Gloucester Local Committee, and open only to Residents in the County of Gloucester.			
68.—Pair of Cows, in-Milk	**15**	**10**	**5**
69.—Cow, in-Milk	**10**	**5**	
70.—Pair of Heifers, in-Milk, calved in 1890	**10**	**5**	

SHEEP.

An Animal cannot be entered in more than one Class.

LEICESTER.			
71.—Shearling RAM	10	5	2
72.—Pair of RAM LAMBS, dropped in 1893	10	5	2
73.—Pen of three Shearling EWES	10	5	2

SHEEP—*continued.*	First Prize.	Second Prize.	Third Prize.	Fourth Prize.
	£	£	£	£
COTSWOLD.				
Shearling RAM	10	5	2	
·Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
·Pen of three Shearling EWES . .	10	5	2	
DEVON LONG-WOOL.				
·Shearling RAM	10	5	2	
·Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
·Pen of three Shearling EWES . .	10	5	2	
'HER LONG-WOOL BREEDS.				
Shearling RAM	10	5	2	
·Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
·Pen of three Shearling EWES . .	10	5	2	
CHAMPION PRIZES.				
red by the Gloucester Local Committee.)				
est Long-woolled Ram or Ram Lamb in any of the Classes	**10**			
est Long-woolled Ewe in any of the Classes	**10**			
SOUTHDOWN.				
Shearling RAM	10	5	2	
Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
Pen of three Shearling EWES . .	10	5	2	
HAMPSHIRE DOWN.				
Shearling RAM	10	5	2	
Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
Pen of three Shearling EWES . .	10	5	2	
SHROPSHIRE.				
Shearling RAM	10	5	**3**	**2**
Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
Pen of three Shearling EWES . .	10	5	**3**	**2**
ie 3rd and 4th Prizes in Classes 89 and 91 are offered by the Shropshire Sheep Breeders' Association.				
OXFORD DOWN.				
Shearling RAM	10	5	2	
Pair of RAM LAMBS, dropped in 1893 .	10	5	2	
Pen of three Shearling EWES . .	10	5	2	

SHEEP—*continued.*	First Prize.	Second Prize.	Third Prize.
SOMERSET AND DORSET HORN.	£	£	£
CLASS			
95.—Shearling RAM	10	5	2
96.—Pair of RAM LAMBS, dropped after Dec. 1st, 1892	10	5	2
97.—Pen of three Shearling EWES	10	5	2
MOUNTAIN.			
98.—Two Shear or Shearling RAM	10	5	2
99.—Pen of three Shearling EWES	10	5	2
OTHER SHORT-WOOL BREEDS.			
100.—Shearling RAM	10	5	2
101.—Pen of three Shearling EWES . . .	10	5	2
CHAMPION PRIZES.			
(Offered by the Gloucester Local Committee.)			
Best Short-woolled Ram or Ram Lamb in any of the Classes	10		
Best Short-woolled Ewe in any of the Classes .	10		

PIGS.

An animal cannot be entered in more than one Class.

CLASS **BERKSHIRE.**			
102.—BOAR, farrowed in 1890 or 1891 . . .	7	3	2
103.—BOAR, farrowed in 1892	7	3	2
104.—Pair of Breeding BOARS, farrowed in 1893 .	5	2	1
105.—Breeding SOW, farrowed before 1893 . .	7	3	2
106.—Pair of Breeding SOWS, farrowed in 1893 . .	5	2	1
LARGE WHITE BREED.			
107.—BOAR, farrowed in 1890 or 1891 . . .	7	3	2
108.—BOAR, farrowed in 1892	7	3	2
109.—Pair of Breeding BOARS, farrowed in 1893 .	5	2	1
110.—Breeding SOW, farrowed before 1893 . .	7	3	2
111.—Pair of Breeding SOWS, farrowed in 1893 . .	5	2	1
MIDDLE WHITE BREED.			
112.—BOAR, farrowed in 1890 or 1891 . . .	7	3	2
113.—BOAR, farrowed in 1892	7	3	2
114.—Pair of Breeding BOARS, farrowed in 1893 .	5	2	1
115.—Breeding SOW, farrowed before 1893 . .	7	3	2
116.—Pair of Breeding SOWS, farrowed in 1893 . .	5	2	1

PIGS—*continued.*	First Prize.		Second Prize.		Third Prize.		Fourth Prize.	
	£	s.	£	s.	£	s.	£	s.
SMALL WHITE or SMALL ss **BLACK BREED.**								
—Boar, farrowed in 1890 or 1891 . .	7	0	3	0	2	0		
—Boar, farrowed in 1892	7	0	3	0	2	0		
—Pair of Breeding Boars, farrowed in 1893	5	0	2	0	1	0		
—Breeding Sow, farrowed before 1893 .	7	0	3	0	2	0		
—Pair of Breeding Sows, farrowed in 1893	5	0	2	0	1	0		
ANY OTHER BREED.								
.—Boar, farrowed in 1890 or 1891 . .	7	0	3	0	2	0		
.—Boar, farrowed in 1892	7	0	3	0	2	0		
.—Pair of Breeding Boars, farrowed in 1893	5	0	2	0	1	0		
.—Breeding Sow, farrowed before 1893 .	7	0	3	0	2	0		
.—Pair of Breeding Sows, farrowed in 1893	5	0	2	0	1	0		
CHAMPION PRIZES.								
Offered by the Gloucester Local Committee.)								
Best Boar in any of the Classes . .	**10**	**0**						
„ Sow „ „ „ . .	**10**	**0**						

CHEESE.

	First Prize.		Second Prize.		Third Prize.		Fourth Prize.	
.—Four Cheeses, made in 1892, not less than 56 lbs. each	20	0	10	0	4	0	1	0
.—Four Cheeses, made in 1893, not less than 30 lbs. each	10	0	5	0	3	0	2	0
The Prizes in Class 129 are offered by the Gloucester Local Committee, and are open only to Residents in the County of Gloucester.								
.—**Eight Single Gloucester Cheeses made in 1893 . . . .**	**5**	**0**	**3**	**0**	**2**	**0**		
.—Ten Loaf or other Truckle Cheeses, made in 1893	4	0	2	0	1	0	0	10
.—Ten North Wilts Loaf Cheeses, made in 1893	4	0	2	0	1	0	0	10
.—Five Cream or other Soft Cheeses .	2	0	1	0	0	10		
.—Four Caerphilly Cheeses, made in 1893	4	0	2	0	1	0	0	10
.—Four Cheddar Cheeses (the total weight being not less than 200 lbs.), made in 1892, by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools	15	0	8	0	6	0	4	0

CHEESE—*continued.* CLASS	First Prize. £ s.	Second Prize. £ s.	Third Prize. £ s.	Fourth Prize. £ s.	Fifth Prize. £ s.
135.—Four Cheddar CHEESES (not less than 30 lbs. each), made in 1893, by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools .	8 0	4 0	3 0	2 0	
BUTTER AND CREAM.					
136.—3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made of cream from Cows other than Channel Island Breeds .	5 0	3 0	2 0	1 0	
137.—3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made of cream from Cows of Channel Island Breeds only . . .	4 0	2 0	1 0	0 10	
The 3rd Prize in Class 138 is offered by the Gloucester Local Committee.					
138.—3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made by Students who have attended a course of instruction at any of the Society's Butter Schools .	5 0	3 0	2 10	2 0	1
The Prizes in Class 139 are offered by the Gloucester Local Committee.					
139.—3 lbs. of Fresh (or very slightly salted) Butter, in pound plain rolls or brick-shapes, made by a Student who has attended a course of instruction at any of the Society's or County Council Butter Schools held in Gloucestershire	**5 0**	**3 0**	**2 0**	**1 0**	
140.—12 lbs. of Salted BUTTER, in a jar or crock, to be delivered to the Secretary at the Guildhall, Gloucester, four weeks before the Show	4 0	2 0	1 0	0 10	
CHAMPION PRIZE, offered by the Gloucester Local Committee for the Best Entry in any of the Butter Classes	**5 0**				
141.—4 half-pounds of Clotted or Devonshire CREAM, packed either in tins or earthen jars	2 0	1 0	0 10		

	First Prize.		Second Prize.		Third Prize.		Fourth Prize.		Fifth Prize.	
BUTTER-MAKING COMPETITIONS.	£	s.	£	s.	£	s.	£	s.	£	s.
(To take place in the Working Dairy in the Showyard. Not open to Makers or Vendors of Churns or their Assistants, *or to any previous winner of the Society's Champion Gold Medal.*) These Prizes will be awarded for the best and largest quantity of Butter made from a given quantity of Cream in the cleanest and most approved method.										
The 3rd Prize in Class 142 is offered by the Gloucester Local Committee.										
CLASS 142.—On the 1st day of the Show open only to Students who have attended a course of instruction at any of the Society's Butter Schools.	5	0	3	0	2	10	1	10	0	10
143.—On the 2nd day of the Show, open to any woman without restriction as to School . . .	5	0	3	0	1	10	0	10		
144.—On the 3rd day of the Show, open to any man or woman, except the winner of the 1st Prize in Class 143	5	0	3	0	1	10	0	10		
145.—On the 4th day of the Show, open to any man or woman, except the winners of the 1st Prizes in Classes 143 and 144. .	5	0	3	0	1	10	0	10		
The Prizes in Class 146 are offered by the Gloucester Local Committee.										
146.—On the 4th day of the Show, open only to Students who have attended a course of instruction at any of the Society's or County Council Butter Schools held in Gloucestershire . .	**5**	**0**	**3**	**0**	**1**	**10**	**0**	**10**		
CHAMPION PRIZES.										
On the 5th day of the Show the Winners of Prizes in Classes 142, 143, 144, 145 and 146 will compete for:— 1st Prize—A Gold Medal and the Society's Certificate. 2nd Prize—A Silver Medal and the Society's Certificate. 3rd Prize—A Bronze Medal and the Society's Certificate.										
Extra Prizes, offered by the Gloucester Local Committee, will be placed at the disposal of the Judges for any Butter-making Competitions on the 5th day of the Show, to the value of .	**8**	**0**								

	First Prize.		Second Prize.		Third Prize.		Fourth Prize.	
DAIRY APPLIANCE.	£	s.	£	s.	£	s.	£	s.
CLASS								
147.—A Gold Medal is offered for the Best Milking Machine.								
The following will be regarded as essential points in deciding upon the merits of the exhibits in Class 147:—Efficiency; simplicity in working; and economy in cost.								
HORSE-SHOEING COMPETITIONS.								
148.—Best Shoeing of a Nag Horse by a Smith in the Showyard on the 3rd day of Show	5	0	3	0	2	0	1	0
149.—Ditto of a Cart Horse on the 4th day of Show	**5**	**0**	**3**	**0**	**2**	**0**	**1**	**0**
The Prizes in Class 149 are offered by the Gloucester Local Committee.								

Prize-winners will also receive a Pair of Shoeing Models, presented by Mrs. Miles, Dixfield House, Exeter, and a copy of Miles's 'Treatise on Shoeing' from the Society.

Certificates of Commendation will be awarded where deserved, and each commended Competitor will be presented with a copy of Miles's 'Treatise on Shoeing.'

The Registration Committee of the Farriers' Company will admit all the Prize-winners and Commended Competitors to the Official Register *free of charge*, on their satisfying the Judges that they have an adequate knowledge of the structure of the horse's foot, and on the necessary application being made to the Company in the prescribed form. The Registration Committee will also admit to the Register, on payment of the usual fees, all other Competitors who shall satisfy the Judges of their competency.

CONDITIONS AND REGULATIONS.

GENERAL.

ENTRIES.

:HIBITORS may make an unlimited number of Entries in each Class those for Cheese, Butter and Cream) at the following Fees, which paid when the Entries are made.

		Members.	Non-members.
'ses (including Horse Box)	for each Entry	10s.	.. 20s.
tle, Sheep and Pigs	do.	5s.	.. 15s.
sey Cattle Butter Test Prizes	do.	21s.	.. 21s.
ese, Class 127	do.	10s.	.. 20s.
)o. Classes 128 to 133	do.	5s.	.. 10s.
)o. Classes 134 and 135	do.	5s.	.. 5s.
:ter, Cream, and Butter-makers ..	do.	2s. 6d.	.. 5s.
ry Appliance	do.	5s.	.. 15s.

se Students can compete in Classes 134 and 135 at the reduced fee by Members—viz., 5s. for each Entry.

ies should reach the Secretary on or before April 13; after that date to April 20, Entries will only be received *on payment of double fees* case.

ie privilege of entering at Members' Fees is limited (except in 134 and 135) to Members of the Society elected on or before y 31, 1893, and subscribing not less than 1*l.* annually.

'here a Prize is offered for a *pair* or *pen* of animals, Single Entry-fees :e payable for each *pair* or *pen*, and only one Entry-form must be used.

ll Entries must be made on the printed forms to be obtained of the .ry (THOS. F. PLOWMAN, 4, Terrace Walk, Bath), and in applying for Exhibitors are requested to state how many Entries they wish to make er Horses, Cattle, Sheep, or Pigs, as each Stock Entry must be made parate Form.

.ll Entry-forms must be signed by the Exhibitor or his Agent. Ex- s are requested to carefully examine the List of Prizes and Conditions, Society cannot be responsible for any errors made by Exhibitors r Entry-forms. An Exhibitor omitting to give information asked for Entry-form, with regard to the age, name, colour, sire, dam, &c., of an l, will be liable to have his Entry disqualified.

'nless otherwise stated, an Animal or Article cannot be entered in ian one Class.

.ll Animals or Articles exhibited must be *bonâ fide* the property of the tor at and from the time of Entry, and, in the case of an imported , the shipping certificate must be produced to the Secretary, in proof ie animal was in this country at the time of Entry.

SHOWYARD.

'he Yard will be open for the reception of Horses, Cattle, Sheep, and)n Monday and Tuesday, May 29 and 30, from 7 A.M. to 6 P.M. will also be received from 6 to 8 o'clock on the morning of the first Show, but all other Stock Entries must be in the Yard the previous (See Regulations 48 and 49 for Dairy Produce.) Labels will be sent Secretary, and must be securely affixed to the head of each Animal, he case of other Exhibits, to the receptacle containing them.

9. All Exhibits and all persons in charge of the same, will be subject to the Orders, Regulations, and Rules of the Society.

10. All Exhibits, except Horses (see Conditions 27 and 28), must remain in the place allotted to them in the Showyard until 6 P.M. on the last day of Show.

11. No Animal can be permitted to be removed from its place without leave from the Steward of the Department, or can leave the Yard till the metal label denoting its number is given up to the Gatekeeper.

12. The Society, its Officers, and Servants, will not be liable for any errors or mistakes that may happen in placing or penning the Stock or Articles to be exhibited, but the Servants in charge of the same must see that they are placed or penned according to their Entries.

13. All Servants in charge of Stock must be in attendance each day during the Show at least a quarter of an hour before the time appointed for parading the animals in the Show-rings, and must take their animals into the ring when desired by the Stewards. Any infringement of this or any other rule, or neglecting to obey the orders of the Stewards, will render the Exhibitor liable to a fine of 1*l.*, and to the forfeiture of any Prize he may be entitled to.

14. The Society will not, in any case, or under any circumstances, hold itself responsible for any loss, damage, misdelivery, illness or accident that may occur *through* or *to* any Exhibit; and it shall be a condition of entry that each Exhibitor shall hold the Society harmless, and indemnify it against any legal proceedings arising from any of the above-named circumstances.

15. Hay, straw, and green food will be delivered to the servants of Exhibitors free of expense at the Forage Stores in the Showyard, and they must take it to their respective Animals. Servants must apply at the Forage Stores for their Forage Tickets after they have brought their Animals into the Yard.

NOTE.—For the convenience of Exhibitors wishing to sell their Animals, a Register will be kept at the Secretary's Office, in which they may enter the prices.

DISQUALIFICATIONS.

16. No Animal that has competed in a Fat Stock Class in any Show shall be eligible to compete for the Prizes offered in this Prize Sheet.

17. No Animal which has taken a First Prize at any Meeting of this Society can compete again in the corresponding Class.

18. An Animal having any unsoundness likely to be transmitted to its progeny, shall be disqualified thereby from receiving any Prize offered by or through the Society.

19. If any wilful mis-statement, or misrepresentation, be proved to have been made by an Exhibitor, either in an Entry-form or otherwise, in connection with this or any Agricultural Society, the Council shall have power to withhold any Prize awarded to him, and to disqualify him from exhibiting at the Society's future Shows. (See also Regulation 5.)

PENALTIES.

20. As the non-exhibition of Animals entered for the Show causes unnecessary preparations and expense, and disarranges the Showyard, any person entering Stock, and failing to exhibit the same, shall pay a penalty of 10*s.* for each Entry, unless a Certificate, under the hand of the Exhibitor or his authorised agent, be lodged with the Secretary of the Society, before the day of Exhibition, certifying that such non-exhibition is caused either by—(1) the death of the animal or animals; or (2) contagious or infectious disease (confirmed by the explanatory Certificate of a Veterinary Surgeon); or (3) by its becoming ineligible for the Class in which it has been entered.

Such fines to be recoverable as debts to the Society, and, until payment, to debar all persons owing them from exhibiting at any future meeting of the Society.

21. Every Exhibitor will be required to undertake to forfeit and pay to the Society the sum of 20*l.*, as and for liquidated damages, if any Animal which he exhibits be to his knowledge suffering from any contagious or infectious disease, and the Stewards are empowered to prevent the entry of any diseased Animal into the Yard, or to have it removed therefrom, if they should consider it desirable.

22. Stock Exhibitors will receive Admission Tickets for the Show for themselves and the Servants required to take charge of their Animals, and Exhibitors will be held responsible for their proper use. If a Ticket is transferred or otherwise improperly used it will be cancelled, and the Exhibitor will be required to pay a fine of 1*l.* Servants in charge of Stock at night must, if they leave the Yard, return before 10 P.M., or they will not be admitted.

AWARDS.

23. In all cases where Prizes are awarded *conditionally*, they will be withheld until the Exhibitor shall have proved to the satisfaction of the Council that the conditions have been complied with.

24. Except under a special recommendation from the Judges, no Second Prize will be given in any of the Classes unless there are three entries, and no Third Prize unless there are six entries.

25. The Certificate of the Veterinary Inspector, whether as to age or soundness, shall be required only in cases where the Judges are in doubt, or where a protest shall be delivered to the Secretary within the time prescribed by Condition No. 26. The decision of the Inspector in such cases shall be final and conclusive; and in case it shall be against the Animal to which a Prize has been awarded, such Animal shall be disqualified from receiving such Prize.

PROTESTS.

26. Any protest must be lodged with the Secretary in the handwriting of an Exhibitor, or that of his representative, before 6 P.M. on the first day of the Exhibition, and no protest will be accepted without a deposit of 3*l.*, which sum will be forfeited at the discretion of the Stewards unless the protest is substantiated. Protests will be considered by the Disqualifying Committee, whose decision shall be final and conclusive.

APPLYING TO CERTAIN CLASSES ONLY.

HORSES.

27. Horses can be removed from the Yard at night on deposit by the Exhibitor of 3*l.* at the Finance Office, which sum will be forfeited if the Horse does not return at 8 A.M. each day during the Exhibition.

28. The Stallions in Classes 1, 2, 6, 7 and 11, are not required to remain in the Yard longer than 6 o'clock in the evening of the third day of the Show.

29. Exhibitors must provide saddles for Horses in Classes 12, 17, 18, and 19, as they are to be ridden; and vehicles and harness for those in Classes 20 and 21, which are to be driven.

30. No Horse, unless a Foal, will be admitted into the ring without a proper bit.

31. The Prizes for Stallions in Classes 1, 2, 6, 7, and 11, will be withheld until a Certificate from the owner is delivered to the Secretary that the Horse has served at least 20 Mares during the current season.

32. In Classes 3, 8, and 16, Mares shall be exhibited with their own foals at foot, or shall hereafter be certified to have produced a living Foal before the 1st of August of the year of the Show.

32A. The following special conditions apply only to the Prize offered by the Shire Horse Society, viz.: the owner of an animal entered to have been a Member of the Bath and West and Southern Counties Society for not less than 6 months previous to April 20, 1893; a Mare six years old, or upwards, to have had a living foal; no animal to compete which has won the Shire Horse Society's Gold Medal during the current year; a certificate that the winning animal is free from hereditary disease to be lodged with the Secretary of the Shire Horse Society.

Cattle.

33. All bulls must have a ring or clamp attached to the nose, and in the aged Classes must be provided with a strong chain. All cattle must be properly secured to the satisfaction of the Officers of the Society, on being brought to the gate of the Yard, or they will not be admitted.

34. All Cattle will be required to be paraded in the ring at least once a day at the discretion of the Stewards.

35. No Bull above 2 years old will be eligible to receive a Prize until certified to have served not less than six different Cows (or Heifers), previous to June 1st, 1893, and it must be the sire of live calves dropped in the year 1892 or 1893.

36. No Cow will be eligible to receive a Prize until certified to have had a living Calf previous to the Show, or that the Calf, if dead, was born at full time within the twelve months preceding the date of the Show.

37. In the Classes for Heifers "in-Milk or in-Calf," no Heifer entered as in-Calf will be eligible to receive a Prize until certified to have produced a living Calf before March 1st, 1894, or that the Calf, if dead, was born at full time before that date.

38. Every Cow or Heifer in-Milk shall be milked dry in the Showyard at 6 P.M. on the evening preceding the day of judging, in the presence of an officer of the Society appointed for the purpose.

39. Any Animal in the Cattle Classes found to be artificially coloured will be disqualified.

40. Any person selling Milk in the Yard, except in the place appointed by the Stewards, will be fined 5s. for each infringement of this Regulation.

Sheep.

41. All Sheep (with the exception of the Welsh Mountain Breed) over one year old must have been really and fairly shorn bare on or after the 1st of April in the year of the Exhibition. Inspectors will be appointed by the Council to examine Sheep, on their admission to the Showyard, with instructions to report to the Stewards any cases in which this has not been done.

42. Each pen of Ewes must be of the same Flock. No Exhibitor shall enter in the Leicester and any other Long-wool Classes from the same Flock.

Pigs.

43. The Pair of Pigs in each pen must be of the same litter.

44. All Sows farrowed before 1893 shall be certified to have had a litter of live Pigs within six months preceding the first day of exhibition, or to be in-Pig at the time of entering, so as to produce a litter of Pigs, farrowed at their proper time, before the 1st of September following. In the case of in-Pig Sows the Prize will be withheld until the Exhibitor shall have furnished the Secretary with a certificate of farrowing as above.

45. All Pigs exhibited with a Sow shall be her own produce, of the same litter, and not exceeding two months old at the time of the Show.

46. No Sow above 18 months old that has not produced a litter of live Pigs shall be eligible to compete in any of the Classes.

47. Any animal in the Pig Classes found to be artificially coloured will be disqualified.

CHEESE, BUTTER AND CREAM.

48. Cheese will be received in the Yard on Monday, May 29, from 7 A.M. to 6 P.M., and on Tuesday, May 30, from 7 to 10 A.M. All Cheese must be in its proper place in the Showyard by 10 o'clock on Tuesday morning, May 30, as the judging of Cheese will take place on that day.

49. Butter (except in Class 140) and Cream will be received in the Yard on Monday and Tuesday, May 29 and 30, from 7 A.M. to 6 P.M., and from 6 to 8 A.M., on Wednesday, May 31. The Butter in Class 140 must be sent to the Society's Secretary, at the Guildhall, Gloucester, on or before May 3rd.

50. No Exhibitor shall make more than two entries in any one class of Cheese, or more than one entry in any one class of Butter or Cream. The Cheese, Butter or Cream must in every case have been made in the Exhibitor's own Dairy by himself, his family or his servants.

51. Any Cheese bored or marked will be disqualified. Any distinctive mark on the Butter or its cloth will disqualify.

52. The winners of first prizes in the Cheese Classes will have to give one Cheese (which the Judges will select) to the Council for public disposal. The First Prize lots of Butter and Cream will be the property of the Council for public disposal. Other Exhibitors of Butter and Cream will have to give 1 lb. from each Exhibit for public tasting; and endeavour will be made to prevent damage to the Exhibits then remaining.

53. Exhibitors must very carefully answer the questions on the Entry-forms.

54. Exhibitors must make their own arrangements for the return of their exhibits, as the Society cannot undertake this.

BUTTER-MAKING COMPETITIONS.

55. Cream will be supplied free of charge, and the Butter will be the property of the Society.

56. The Society will supply Competitors with churns, &c., or they can bring their own appliances if they prefer to do so.

57. Competitors who work the Butter with their hands will be disqualified.

58. No previous winner of the Society's Champion Gold Medal is eligible to compete for any Prize given in the Butter-making Competitions in the Showyard.

MILKING MACHINES.

59. Exhibitors in Class 147 must attend at the Working Dairy in the Yard on Tuesday, May 30, at 10 A.M., and each day afterwards when required by the Stewards, to explain the working of their Exhibits.

HORSE-SHOEING COMPETITIONS.

60. All Entries must be made on the printed forms to be obtained of the Secretary, and must reach him on or before May 8, 1893. The Entry Fee is 5s., which must be sent with the Entry.

61. The Competitions will take place on Friday and Saturday, June 2 and 3, 1893, at 10 o'clock, at which hour Competitors must attend at the Secretary's Office in the Showyard.

62. Each competitor must make and fix a fore-shoe in the Showyard, having previously taken off the old shoe.

63. A Competitor must bring his own Tools, Nails and a Striker, but the Society will provide forges, anvils, flat iron, and fuel.

64. All Shoes must be fullered.

65. No Man who has already won a First Prize given by the Society for Horse-Shoeing will be eligible to compete again in the same class.

ADJUDICATION OF PRIZES FOR LIVE STOCK.

By the Bye-Laws of the Society the Judges are instructed:—

1. Not to award any Prize or Commendation unless the animal possesses sufficient merit.
2. Not to award a Prize to any Horse or Mare, unless it is free from unsoundness likely to be transmitted to its progeny; or if a Gelding, unless free from unsoundness (an accident having temporary consequences only excepted).
3. In awarding Prizes to Cattle, Sheep, and Pigs, to decide according to the relative merits of the animals for Breeding purposes, and not to take into consideration their present value to the butcher.
4. To record the number of any animals which may in their opinion be possessed of sufficient merit to succeed to vacancies caused by disqualification. Animals so placed in a Reserved List shall, in the event of any case of disqualification, succeed to the Prize or Prizes according to the Judges' award.

Should any question arise which the Judges may desire to refer to another tribunal, the Stewards of Stock shall assist them in providing a Referee.

RAILWAY ARRANGEMENTS.

The Railway Companies agree to the following arrangements for the Conveyance of Stock to and from the Show:—

1. Stock to be charged full rates to the Show, but half rates on the return journey at owner's risk if unsold, and on production of a Certificate to that effect from the Secretary of the Society. The reduction to half rate is allowed only when the Stock is returned to the same Station as that from which it was conveyed to the Show and by the same route.
2. The foregoing regulations to apply to Animals whether carried in horse boxes by passenger or special train, or in cattle trucks by luggage trains. The concession as to Animals in horse boxes is granted only on the condition that the present orders of the Board of Agriculture, under which the Companies are not required to disinfect horse boxes, remain in force. If the unsold Stock, which was conveyed on the Outward Journey by Goods Train in Cattle Trucks, be required to be returned by Passenger Train in Horse Boxes, half the Passenger rates will be charged, and *vice versâ.*

In accordance with a recent arrangement, the Railway Companies will provide specially constructed covered Cattle Trucks at a reduced rate of charge, further proportionate reduction being made when more than one Animal is carried.

To insure prompt delivery of Stock, Exhibitors are recommended to ascertain the *proper time for loading* from the Superintendent or Booking Clerk at the Station from which their Stock is intended to be despatched.

Telegraphic Address—"Plowman," Bath.

GLOUCESTER MEETING,

MAY 31, JUNE 1, 2, 3, AND 5, 1893.

PRIZES FOR POULTRY.

	First Prize.	Second Prize.	Third Prize.
ection 1.—GENERALLY USEFUL BREEDS.	£ s.	s. d.	s. d.
'OCHINS (Cinnamon and Buff)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
'OCHINS (Partridge-Feathered or White)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
3RAHMAS (Dark)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
3RAHMAS (Light)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
ANGSHANS—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
'LYMOUTH ROCKS—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
VYANDOTTE—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
)RPINGTON—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
'HICKENS OF 1893 (Cochin, Brahma, Langshan, Plymouth Rock, Wyandotte, or Orpington)—Cockerel	1 10	15 0	5 0
)itto—Pullet	1 10	15 0	5 0
ion 2.—LAYING OR NON-SETTING BREEDS.			
SPANISH—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IINORCAS—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
EGHORNS (Any Variety)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IOUDANS—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
'OLISH FOWL—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IAMBURGS (Golden Spangled)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IAMBURGS (Silver Spangled)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IAMBURGS (Golden Pencilled)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IAMBURGS (Silver Pencilled)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
IAMBURGS (Black)—Cock	1 10	15 0	5 0
)itto—Hen	1 10	15 0	5 0
HICKENS OF 1893 (Spanish, Minorca, Leghorn, Houdan, Polish, or Hamburg)—Cockerel	1 10	15 0	5 0
)itto—Pullet	1 10	15 0	5 0

Section 3.—BREEDS SUITABLE FOR THE TABLE.

Class	First Class. £ s.	Second Class. s. d.	Third Class. s. d.
41.—Dorkings (Coloured)—Cock	1 10	15 0	5 0
42.—Ditto—Hen	1 10	15 0	5 0
43.—Dorkings (Silver Grey)—Cock	1 10	15 0	5 0
44. Ditto—Hen	1 10	15 0	5 0
45.—Dorkings (White or Cuckoo)—Cock	1 10	15 0	5 0
46.—Ditto—Hen	1 10	15 0	5 0
47.—Game (Black-Breasted Reds)—Cock	1 10	15 0	5 0
48.—Ditto—Hen	1 10	15 0	5 0
49.—Game (Brown-Breasted Reds)—Cock	1 10	15 0	5 0
50.—Ditto—Hen	1 10	15 0	5 0
51.—Game (Pile or any other Variety)—Cock	1 10	15 0	5 0
52.—Ditto—Hen	1 10	15 0	5 0
53.—Game (Old English)—Cock	1 10	15 0	5 0
54.—Ditto—Hen	1 10	15 0	5 0
55.—Malays—Cock	1 10	15 0	5 0
56.—Ditto—Hen	1 10	15 0	5 0
57.—Indian Game—Cock	1 10	15 0	5 0
58.—Ditto—Hen	1 10	15 0	5 0
59.—Any other Distinct Variety not Mentioned—Cock	1 10	15 0	5 0
60.—Ditto—Hen	1 10	15 0	5 0
61.—Chickens of 1893—(Dorking, Game, Malay, Indian Game, or any other Variety not mentioned)—Cockerel	1 10	15 0	5 0
62.—Ditto—Pullet	1 10	15 0	5 0
63.—Chickens of 893 (either pure-bred or cross-bred)—Two Cockerels	1 10	15 0	5 0
64.—Chickens of 893 (either pure-bred or cross-bred)—Two Pullets	1 10	15 0	5 0

SELLING CLASSES.*

Class	First Class. £ s.	Second Class. s. d.	Third Class. s. d.
65.—**ANY DISTINCT BREED**—**Cock** (*price not to exceed* 1*l*. 1*s*.)	1 10	15 0	5 0
66.—**ANY DISTINCT BREED**—**Hen** (*price not to exceed* 1*l*. 1*s*.)	1 10	15 0	5 0
67.—**ANY DISTINCT BREED**—**Cock and Hen** (*price not to exceed* 30*s*.)	1 10	15 0	5 0

Section 4.—DUCKS, GEESE AND TURKEYS.

Class	First Class. £ s.	Second Class. s. d.	Third Class. s. d.
68.—Drake or Duck (Rouen or Aylesbury)	1 10	15 0	5 0
69.—Ditto (Pekin)	1 10	15 0	5 0
70.—Couple of Ducklings (Any Pure or Cross-bred Variety)	1 10	15 0	5 0
71.—Gander or Goose (Any Variety)	1 10	15 0	5 0
72.—Turkeys—Cock or Hen	1 10	15 0	5 0

* The Prizes in Classes 65, 66, 67 and 73 are offered by the Gloucester Local Committee.

SELLING CLASS.*

CLASS	First Class. £ s.	Second Class. s. d.	Third Class. s. d.
73.—**PAIR OF DUCKS** (*price not to exceed* 25s.)	1 10	15 0	5 0

Section 5.—FANCY BREEDS.

74.—BANTAMS (Black or white)—Cock	1 0	10 0	5 0
75.—Ditto—Hen	1 0	10 0	5 0
76.—BANTAMS (Game, Any Variety)—Cock	1 0	10 0	5 0
77.—Ditto—Hen	1 0	10 0	5 0
78.—BANTAMS (Any other Distinct Variety)—Cock	1 0	10 0	5 0
79.—Ditto—Hen	1 0	10 0	5 0

POULTRY.

CONDITIONS AND REGULATIONS.

CHARGES, &C.

1. Exhibitors may make an unlimited number of Entries in each Class on payment of fees as follows:—

Classes 1 to 64 inclusive	5s. per entry.
„ 65 to 67 „	3s. „
„ 68 to 72 „	5s. „
„ 73 to 79 „	3s. „

The above fees include coops, food, and attendance.

N.B.—The above Fees *must* be sent with the Entries, or no notice will be taken of the latter.

2. All entries must be made on the printed forms, to be obtained of the Secretary (THOS. F. PLOWMAN, 4, Terrace Walk, Bath), and such forms must be correctly filled up and returned to the Secretary, together with all fees due, on or before May 8th. Exhibitors are requested to carefully examine the List of Prizes and Conditions, as the Society cannot be responsible for any errors made by Exhibitors in the Entry forms, and birds entered in a wrong Class will be necessarily excluded from competition. No alterations can be made in Entry forms after they have been received by the Secretary.

3. The Council reserve the right to refuse the entries of any person.

4. Exhibitors must state the price, breed, and age of their birds on their Entry forms.

SHOWYARD.

5. All birds must be in the Showyard *on Tuesday, May 30th*, and no bird can be removed before Monday, June 5th, at 7 P.M. Any Exhibitors who send for their birds must do so between 7 and 8 P.M. on that day.

6. All carriage must be prepaid to Gloucester Railway Station, otherwise the birds will not be received at the Exhibition; but they will be conveyed free of expense from the Station to the Showyard and back.

7. No Exhibitor or Servant will be allowed into the tent until the birds have been judged.

8. The Poultry Tent will not be open to the public until 2 o'clock on the first day of the Exhibition.

* The Prizes in Classes 65, 66, 67 and 73 are offered by the Gloucester Local Committee.

9. One Admission Ticket, available whenever the Show is open to the public, will be given to each Exhibitor whose Entry-fees amount to 1*l*. and upwards.

Table Poultry.

10. In classes 63 and 64, quality for the table will be considered before mere weight. The date of hatching must be given, and in the case of cross-bred birds, the breeds of the parent.

Sales.

11. All birds may be claimed, at the price put upon them, any time after 4 o'clock on Wednesday, May 31st, and a sale *must take place* if the price stated be paid to the Clerk in the Poultry Office at the time of claiming. *No alteration can be made in the prices stated on the Entry forms* and in the Catalogue until after Friday, June 2nd, when the price may be reduced on payment to the Stewards of 1*s*. per pen on each alteration. Birds must be *sold in pens*, and the price stated must include the basket. A charge of 10 per cent. will be made for all birds sold. The persons who have the management of the sales cannot take charge of birds which are disposed of privately.

Disqualifications.

12. The Judges are empowered to withhold a prize or prizes where birds are not considered of sufficient merit, or to disqualify any that have been clipped, drawn, trimmed, marked, or dyed, and an Exhibitor detected in a false statement as to the age, &c., of any bird, or in any other practice calculated to deceive or mislead the Judges or Stewards, shall forfeit all or any prizes awarded to him or her at the Show, and will be disqualified from competing at any future Show of the Society.

13. Unhealthy birds will not be exhibited, but will be immediately returned to their owners, and the fees will be forfeited.

Protests.

14. In order to check frivolous and vexatious protests, no protest will be entertained unless accompanied by a deposit of 1*l*. in each case; and in case the protest is not substantiated, the deposit may be forfeited to the funds of the Society. All protests must be made before 12 o'clock (noon) on Thursday, June 1st.

Forfeits.

15. Persons entering birds, and failing to send the same to the Exhibition, will forfeit the entrance fee for each pen so left vacant.

General.

16. All birds shown must be *bonâ fide* the property of the Exhibitor.

17. For each pen entered, the Exhibitor will receive a Label, on the reverse side of which he must legibly write his name and address for the return journey.

18. All Eggs laid at the Exhibition will be destroyed.

19. The Stewards pledge themselves to take every care of the birds exhibited, but neither they nor the Society will in any case be responsible for any accident, loss, or damage, from whatever cause arising, the exhibits being entered at the sole risk of the Exhibitors, and Exhibitors will be required to hold the Society harmless in the event of loss.

20. In case of death of any bird during the Exhibition, it will be sent back for the inspection of the Exhibitor.

21. The Poultry Department is subject to the rules and regulations of the Society, and its officers.

*** *The use of properly-constructed poultry baskets will facilitate the safe and speedy conveyance of the specimens to and from the Exhibition.*

The Society cannot, under any circumstances, undertake to send telegrams to Exhibitors as to Judges' awards.

Applications for Catalogues (price 1s. each) and printed lists of awards should be made to the Publishers, Messrs. W. Lewis and Sons, *Herald Office, Bath.*

NANCIAL STATEMENTS

FOR

1892

WITH ITEMS OF 1891 *FOR COMPARISON.*

The Bath and West

SUMMARY OF THE CASH ACC

WITH COMPAR

DR.

RECEIPTS.	£ s. d.	1892. SWANSEA. £ s. d.	1892. SWANSEA. £ s. d.	£
General Receipts:—				
Dividends and Interest		576 6 6		5
Sale of Office Fittings		1 15 6		
Subscriptions from Members		1,127 14 0		1,2
Life Compositions		140 10 0		1
Journal		40 14 2		
			1,887 0 2	1,9
Show Receipts:—				
Implements		1,470 17 0		1,8
Horses	288 13 6			3
Cattle, Sheep, and Pigs	505 14 0			5
Catalogues, &c.	120 13 11			1
		915 1 5		9
Poultry		108 11 6		1
Arts	6 7 0			
Art Union	85 0 0			1
Art-Manufactures	105 12 0			1
		196 19 0		3
Horse Shoeing		11 15 0		
Music		17 9 6		
Cheese and Butter		92 12 2		2
Working Dairy		193 18 3		1
Wool		..		
Flannel and Knitting		27 6 0		
Refreshment Contracts		348 0 0		4
Admissions		4,961 11 0		5,3
Unapportionable:—				
Cloak Rooms, &c.	30 0 3			
Stand Fittings	205 12 3			3
		235 12 6		3
Subscription from Gloucester for 1893 Show		800 0 0		8
			9,379 13 4	10,6
Experiments			150 0 0	1
Dairy Schools			4,417 3 7	2,6
			15,833 17 1	15,8
Returned on Deposit Account				5
BALANCE BROUGHT FORWARD, JAN. 1, 1892			213 15 7	9
			16,047 12 8	15,9

›outhern Counties Society.

ꝛ THE YEAR ENDING DEC. 31ST, 1892,
TEMENT FOR 1891. Cr.

PAYMENTS.	£ s. d.	1882. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
General Expenses:—				
Salaries		775 0 0		775 0 0
Rent, Postage, Stationery, &c.		247 13 7		277 1 1
Journal		522 13 1		531 8 7
			1,545 6 8	1,583 9 8
Show Expenses:—				
Implements		595 11 5		706 3 7
Horses	695 3 9			826 0 4
Cattle, Sheep, and Pigs	2,249 6 9			2,206 2 7
Fodder, &c.	484 13 1			442 19 1
		3,429 3 7		3,475 2 0
Poultry		284 13 4		282 15 10
Arts	276 7 3			297 1 10
Art Union	184 14 9			244 13 9
Art-Manufactures	65 13 4			81 3 3
		526 15 4		622 18 10
Horse Shoeing		20 3 1		18 17 4
Music		216 14 3		253 10 1
Horticulture		..		156 19 2
Cheese and Butter		239 17 7		292 13 10
Working Dairy		492 16 11		432 8 2
Wool and Bees		10 0 0		33 14 9
Flannel and Knitting		18 8 2		..
Refreshment Contracts		54 15 10		62 1 9
Public Announcements		429 8 11		486 6 9
Unapportionable:—				
Stand Fittings	171 1 9			269 3 8
Erection of Offices, &c.	509 19 1			513 5 9
Carriage of Plant	95 9 5			91 14 6
Police	203 2 9			180 3 0
Miscellaneous	382 12 10			247 17 5
		1,362 5 10		1,302 4 4
			7,680 14 3	8,125 16 5
Experiments			257 14 5	371 2 2
Dairy Schools			3,830 16 10	2,666 17 3
			13,314 12 2	12,747 5 6
Investments and Deposit			1,500 0 0	3,000 0 0
Balance in Bank			1,233 0 6	213 15 7
			16,047 12 8	15,961 1 1

udited and found correct,
ALBERT GOODMAN, F.C.A.,
Auditor.
January 18th, 1893.

Passed by Council,
January 31st, 1893.
THOS. F. PLOWMAN,
Secreta

h. 2

The Bath and West an

Dr. CASH ACCOUNT FOR THE YEAR ENDING DEC. 31

RECEIPTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891 Bath £ s.
DIVIDENDS AND INTEREST	..	576 6 6	527 1
SALE OF OFFICE FITTINGS	..	1 15 6	..
SUBSCRIPTIONS FROM MEMBERS:—			
Arrears	21 4 0		67 1
Governors	245 18 0		268 1
Subscribers of £1 and upwards	830 2 0		889
Ditto of 10s.	30 10 0		34
		1,127 14 0	1,259 1
LIFE COMPOSITIONS	..	140 10 0	105
JOURNAL:—			
Sales	15 10 9		13 1
Advertisements	25 3 5		25
		40 14 2	39
IMPLEMENTS:—			
Entry Fees	72 10 0		96
Fees for Space:—			
Machinery-in-Motion Shedding	215 10 0		299
Ordinary Shedding	346 0 0		435 1
Miscellaneous Shedding	393 1 0		460 1
Boarded ,,	201 15 0		298
Seed ,,	39 10 0		27
Uncovered Ground	86 19 0		108
Catalogue Fees	115 12 0		139 1
		1,470 17 0	1,864 1
Carried forward	..	£ 3,357 17 2	

Southern Counties Society.

892, WITH COMPARATIVE STATEMENT FOR 1891. Cr.

PAYMENTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
GENERAL:—			
Salaries:—			
Secretary (including Clerks, Gas, Coal, Lodgings at Show, &c.)	700 0 0		700 0 0
Auditor	20 0 0		20 0 0
Consulting Chemist	30 0 0		30 0 0
Consulting Botanist	25 0 0		25 0 0
		775 0 0	775 0 0
Printing	35 13 5		38 2 8
Stationery and Finance Books	45 0 10		39 3 6
Postage, Telegrams, Cheque and Receipt Stamps	68 14 10		72 8 11
Rent of Offices	26 0 0		26 0 0
Railway Fares	24 7 0		17 17 4
Carriage	6 13 4		6 9 10
Directories and Reference Books	2 14 2		3 4 9
Finance Committee's Expenses	11 18 0		12 13 5
Subscription to Bath Literary Institution	2 2 0		2 2 0
Repairs	9 15 6		6 16 8
Hire of London Council Room	4 14 6		2 2 0
Office Furniture	10 0 0		..
Grant to Railway Rates Association	..		50 0 0
		247 13 7	277 1 1
JOURNAL:—			
Editor	100 0 0		100 0 0
Associate Editor	100 0 0		100 0 0
Printing and binding	238 16 10		240 7 9
Plans	3 15 0		3 15 0
Postage, Stationery and Journal Distribution	37 2 9		40 6 10
Payments to Authors	40 0 0		44 9 0
Railway Fares	2 18 6		2 10 0
		522 13 1	531 8 7
IMPLEMENTS:—			
Shedding	503 14 5		625 2 7
Stewards and Assistants	56 5 7		50 3 9
Printing and Stationery	35 11 5		30 17 3
		595 11 5	706 3 7
Carried forward	..	£ 2,140 18 1	

Dr. CASH ACCOUNT—*continued.*

RECEIPTS.	£ s. d.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward . . .		..	3,357 17 2	..
HORSES, CATTLE, SHEEP, AND PIGS:—				
Horses:—Entry Fees	98 10 0			139 10 0
Fines and Forfeits	5 0 0			7 0 0
Grand Stand Admissions . . .	100 3 6			141 1 0
Special Prizes	85 0 0			25 0 0
		288 13 6		312 11 0
Cattle, Sheep and Pigs:—Entry Fees .	285 4 0			388 5 0
Fines	20 10 0			19 11 0
Special Prizes	200 0 0			105 0 0
		505 14 0		512 16 0
Hurdles	22 12 6			59 11 0
Catalogues	80 14 2			80 8 7
Manure and Fodder	17 7 3			3 6 0
		120 13 11		143 5 7
			915 1 5	968 12 7
POULTRY:—				
Entry Fees		97 10 0		104 18 0
Special Prizes		10 0 0		..
Commission on Sales		1 1 6		2 0 0
			108 11 6	106 18 0
HORSE-SHOEING:—				
Entry fees		11 15 0		12 10 0
Sale of Nails and Iron		..		1 12 0
			11 15 0	14 2 0
Carried forward . . .		.. £	4,393 5 1	

CASH ACCOUNT—*continued.* Cr.

PAYMENTS.	£ s. d.	£ s. d.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward . . .			..	2,140 18 1	
HORSES, CATTLE, SHEEP, AND PIGS:—					
Horses—Prizes .	417 0 0				
Less deferred	10 0 0				
		407 0 0			409 0 0
Shedding and Grand Stand . .		208 6 0			357 13 4
Stewards and Assistants . .		44 19 0			29 10 0
Judges		31 7 1			28 10 0
Fine returned, &c. . . .		3 11 8			..
Engraving Plate . . .		..			1 7 0
			695 3 9		826 0 4
Cattle—Prizes .	1,094 0 0				
Less deferred	45 0 0				
		1,049 0 0			1,041 0 0
Sheep—Prizes		452 0 0			452 0 0
Pigs—Prizes		212 0 0			192 0 0
Shedding and Canvas . . .		277 16 6			316 6 7
Stewards and Assistants . .		65 19 0			42 17 3
Judges		192 11 3			161 18 9
			2,249 6 9		2,206 2 7
Hurdles		76 1 8			86 6 8
Fodder		240 0 0			215 6 9
Steward of Fodder and Assistants		21 11 6			20 15 0
Veterinary Inspector. . .		25 6 4			21 8 6
Rosettes		10 4 1			9 16 8
Printing and Stationery . .		50 0 3			52 8 10
Deferred Prizes (1891) . .		33 0 0			30 0 0
Miscellaneous		2 5 0			6 16 8
Refreshments to Judges . .		12 4 3			..
Do. (1891) . . .		14 0 0			..
			484 13 1		442 19 1
				3,429 3 7	3,475 2 0
POULTRY:—					
Marquee, Staging and Sheds			55 1 2		58 11 2
Stewards and Assistants			21 1 7		16 1 3
Judges			8 3 0		14 9 10
Prizes			183 10 0		174 15 0
Food and Pens			10 0 4		7 13 0
Printing and Stationery			5 0 10		5 17 0
Cartage, Hampers, &c.			1 16 5		5 8 7
				234 13 4	282 15 10
HORSE-SHOEING:—					
Prizes			7 1 0		7 18 9
Judge			6 10 0		5 0 0
Printing			0 7 2		0 18 6
Anvils, Forges, Coals and Horses			6 4 11		5 6 1
				20 3 1	18 17 4
Carried forward				£5,974 18 1	

Dr. **CASH ACCOUNT**—*continued.*

RECEIPTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s.
Brought forward	..	4,393 5 1	..
ARTS:—			
Commission on Picture Sales	1 7 0		2 15 1
Catalogues	5 0 0		5 0
		6 7 0	7 15
ART UNION:—			
Sale of Tickets	..	85 0 6	136 0
ART MANUFACTURES:—			
Fees for Space	..	105 12 0	157
MUSIC:—			
Admissions to Enclosure	..	17 9 6	23
CHEESE AND BUTTER:—			
Entry Fees	50 17 6		92
Cheese and Butter Sales	7 14 8		15 1
Special Prizes	34 0 0		94
		92 12 2	202
WORKING DAIRY:—			
Admissions	84 16 9		57 1
Entry Fees, Buttermaking Competitions	43 12 6		36 1
Ditto Dairy Appliances	9 9 0		25 1
Sale Premium	20 0 0		21
Special Prizes	16 0 0		25
Miscellaneous (Sale of Straw)	20 0 0		2
		193 18 3	167 1
Carried forward	..	£4,894 4 0	

CASH ACCOUNT—*continued.* Cr.

PAYMENTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward	..	5,874 18 1	..
ARTS:—			
Labour and Fittings	60 11 4		74 0 7
Steward and Assistants	33 1 10		33 14 3
Selector	20 0 0		20 0 0
Receiving Steward	40 0 0		40 0 0
Do for Labour and Materials	38 15 11		37 0 6
Do. do. do. (1890)	..		29 15 6
Local Agents and Carriage	72 9 2		53 17 0
Printing and Stationery	7 7 0		8 14 0
Damaged Pictures	4 2 0		..
		276 7 3	297 1 10
ART UNION:—			
Pictures purchased	167 6 9		222 10 0
Printing and Stationery	6 16 0		6 9 9
Advertising	2 2 0		2 2 0
Commission on Sale of Tickets	8 10 0		13 12 0
		184 14 9	244 13 9
ART-MANUFACTURES:—			
Labour and Fittings	55 14 4		68 2 3
Steward and Assistants	6 15 0		8 9 3
Printing	3 4 0		2 15 9
Fees returned	..		1 16 0
		65 13 4	81 3 3
MUSIC:—			
Bands and their Fares	167 17 10		210 0 0
Erecting Band Stands and Seats	34 17 5		33 18 11
Steward and Assistants	13 13 9		9 11 2
Printing and Stationery	0 5 3		..
		216 14 3	253 10 1
HORTICULTURE:—	..	..	156 19 2
CHEESE AND BUTTER:—			
Judges	15 14 3		12 12 0
Prizes	178 10 0		201 10 0
Steward	4 5 0		7 13 0
Shedding	33 17 3		57 14 5
Printing, Stationery, &c.	3 11 5		5 14 5
Grass Table for Butter	3 19 8		7 10 0
		239 17 7	292 13 10
WORKING DAIRY:—			
Steward and Assistants	55 17 5		49 18 0
Judges and Demonstrators	66 14 2		56 18 6
Building	266 17 3		194 11 0
Printing, Stationery, Postage, and Insurance	9 16 0		15 9 6
Utensils and Carriage	10 1 4		12 8 10
Prizes	57 19 2		84 1 2
Coal, Salt, Ice, Cloths, &c.	5 11 7		13 9 2
Sale Premium Returned	20 0 0		..
Horse Hire	..		5 12 0
		492 16 11	432 8 2
Carried forward	..	£ 7,351 2 2	

DR. CASH ACCOUNT—*continued.*

RECEIPTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891 Bath £ s.
Brought forward	..	4,894 4 0	..
WOOL AND BEES:—			
Prizes and Entry Fees	..		15 1
FLANNEL AND KNITTING:—			
Entry Fees	12 5 0		
Special Prizes	15 1 0		
		27 6 0	..
EXPERIMENTS:—			
Government Grant for 1891	150 0 0		150
Returned for Manures	..		5 1
		150 0 0	155 1
ADMISSIONS TO SHOWYARD:—			
Admissions at 2*s.* 6*d.*	2,068 15 0		2,708 1
Ditto at 1*s.*	2,495 1 0		2,356
Children at 1*s.*	69 6 0		88 1
Ditto at 6*d.*	117 14 0		126 1
Season Tickets	210 15 0		96
Chairs at 3*s.* 6*d.*	..		0 1
		4,961 11 0	5,377
SHOW REFRESHMENT CONTRACTS:—			
Sale Premiums	..	348 0 0	427
SHOW RECEIPTS UNAPPORTIONABLE:—			
Exhibitors for Stand-fittings	191 12 3		309
Do. do. for 1891	14 0 0		..
Cloak Room, Parcels Office, and Photographs	30 0 3		49 1
		235 12 6	359
SUBSCRIPTIONS FROM TOWNS:—			
Gloucester, for 1893 Show	..	800 0 0	800
Carried forward		£11,416 13 0	

CASH ACCOUNT—*continued.* Cr.

PAYMENTS.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward	..	7,351 2 2	..
WOOL AND BEES:—			
Prizes, Shedding, &c.	..	..	23 14 9
Grant from Council for Bee Tent	..	10 0 0	10 0 0
			33 14 9
FLANNEL AND KNITTING:—			
Prizes	9 1 0		
Printing	2 10 7		
Judges	6 16 7		
		18 8 2	..
EXPERIMENTS:—			
Farmers, Bailiffs and Superintendence	101 17 0		122 17 0
Manures	78 6 7		157 15 2
Analyses	2 5 0		..
Stewards' Assistant, and Postage	18 15 0		12 10 0
Printing and Stationery	28 17 9		34 15 0
Inspector's Travelling and Hotel Expenses	27 13 1		43 5 0
		257 14 5	371 2 2
PUBLIC ANNOUNCEMENTS:—			
Advertising	209 17 5		259 13 0
Bill Posting	122 1 4		142 0 4
Printing	93 10 2		80 13 5
Rent of Placard-Frames Stores	4 0 0		4 0 0
		429 8 11	486 6 9
SHOW REFRESHMENT CONTRACTS:—			
Tent and Shedding	49 13 2		56 19 2
Printing, &c.	5 2 8		5 2 7
		54 15 10	62 1 9
SHOW EXPENSES UNAPPORTIONABLE:—			
Erection of Offices and other Buildings	509 19 1		513 5 9
Carriage and Storage of Plant	95 9 5		91 14 6
Stewards of Works	23 18 6		19 5 0
Exhibitors' Stand Fittings	171 1 9		269 3 8
Extension of Telegraph Wires	7 5 6		13 5 9
Insurance of Plant	4 10 0		4 10 0
Hire of Furniture	9 14 0		8 16 0
Hire of Mess Room	5 5 0		5 5 0
Gatekeepers	67 12 0		39 8 4
Yardmen and Messengers	4 18 6		4 12 1
Stewards of Finance and Treasurer	34 6 3		26 1 3
Finance Office and Treasurer's Clerks	42 1 1		39 16 6
Cloak Room Officials	11 15 4		8 2 0
Police	203 2 9		180 3 0
Badges, &c.	2 14 3		2 5 10
Catalogues for Press and Officials	4 13 3		7 15 0
Purchase of Plant	40 6 9		37 16 1
Printing and Stationery	28 9 8		22 8 5
Commission on Sale of Season Tickets	5 12 8		0 12 4
Cartage and Sundries	14 10 1		7 17 4
Grant to Bath Local Committee (1891)	50 0 0		..
,, Swansea Horse Show	25 0 0		..
		1,362 5 10	1,302 4 4
Carried forward		£ 9,483 15 4	

Dr. **CASH ACCOUNT—*continued.***

RECEIPTS.	£ s. d.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891 Bath £ s.
Brought forward . . .		..	11,416 13 6	
BUTTER SCHOOLS:—				
Somerset:—				
Students' Fees	110 3 6			93
Spectators' Admissions . .	31 3 3			40 1
Sale of Produce	112 1 6			326 1
Sale of Appliances . .	4 9 9			4
Grant from County Council . .	814 16 7			1,000
		1,072 14 7		1,463 1
Hereford and Dorset		..	..	63 1
Surrey:—				
Grant from County Council . .	250 0 0			250
Balance returned on Steward's Account	0 0 8			1 11
		250 0 8		251 11
Kent:—				
Grant from County Council		750 0 0		
Glamorganshire:—				
Grant from County Council		450 0 0		
Carried forward . . £		2,522 15 3	11,416 13	

CASH ACCOUNT—*continued.*

Cr.

PAYMENTS.	£ s. d.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward . . .		..	9,483 15 4	..
UTTER SCHOOLS:—				
Somerset:—				
Teachers' Salaries and Expenses .	213 7 0			153 15 9
Steward's Time and Expenses .	98 9 8			190 6 5
Judges' Time and Expenses . .	26 16 8			14 16 9
Secretary's Travelling Expenses .	2 13 11			18 6 10
Office Staff	24 12 6			43 11 8
Engineer and other Dairy Attendants	100 19 9			45 8 7
Milk and Cream	211 1 8			360 19 9
Coal, Salt, Ice, &c.	58 2 2			39 16 8
Fittings	10 17 5			10 5 5
Carriage of Plant	36 11 5			36 12 9
Printing and Stationery . .	27 7 7			26 0 11
Postage and Telegrams . . .	16 10 4			12 10 1
Prizes to Students	58 0 0			41 5 0
Purchase of Plant	39 0 0			62 11 1
		924 10 1		1,056 7 8
Hereford and Dorset . . .		..	..	170 2 6
Surrey:—				
Teachers' Salaries and Expenses .	48 0 8			69 15 10
Steward's Time and Expenses .	9 2 1			137 16 2
Judges' Time and Expenses . .	6 5 3			10 8 6
Secretary's Travelling Expenses .	3 2 8			4 18 2
Office Staff	6 0 0			7 11 8
Dairy Attendants	14 4 5			15 4 6
Milk and Cream	10 9 3			22 14 2
Coal, Salt, Ice, &c.	2 17 8			10 15 2
Fittings	..			0 3 6
Carriage of Plant	7 15 6			25 2 0
Printing and Stationery . .	..			6 15 4
Postages and Telegrams . .	0 10 0			4 13 0
Prizes to Students	6 10 0			12 10 0
Purchase of Plant	0 5 0			..
		115 2 6		328 8 0
Kent:—				
Teachers' Salaries and Expenses .	200 11 3			
Steward's Time and Expenses .	218 0 5			
Judges' Time and Expenses . .	23 6 0			
Secretary's Travelling Expenses .	3 7 9			
Office Staff	18 12 6			
Dairy Attendants	50 16 2			
Milk and Cream	79 18 10			
Coal, Salt, Ice, &c.	41 4 7			
Fittings	1 6 0			
Carriage of Plant	32 16 4			
Printing and Stationery . .	5 3 0			
Postage and Telegrams . .	6 6 4			
Prizes to Students	34 19 0			
Purchase of Plant	19 7 4			
		735 15 6		
Glamorganshire:—				
Teachers' Salaries and Expenses .	102 10 11			
Steward's Time and Expenses .	96 13 6			
Judges' Time and Expenses . .	11 16 4			
Office Staff	6 15 0			
Dairy Attendants	16 9 6			
Milk and Cream	44 16 10			
Coal, Salt, Ice, &c	15 13 10			
Fittings	1 10 8			
Carriage of Plant	19 8 5			
Printing and Stationery . .	1 1 0			
Postages and Telegrams . .	5 13 0			
Prizes to Students	22 0 0			
Purchase of Plant	13 18 8			
		358 7 8		
Carried forward . . . £		2,133 15 9	9,483 15 4	

Dr. CASH ACCOUNT—*continued.*

RECEIPTS.		£ s. d.	1892. Swansea. £ s. d.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
Brought forward			2,522 15 3	11,416 13 6	
BUTTER SCHOOLS—*continued.*					
Dorset:—					
Grant from County Council			500 0 0		
Miscellaneous:—					
Government Grant for 1891		150 0 0			
Insurance Co. for Fire Damage		14 0 0			
			164 0 0		11 6 9
				3,186 15 2	1,790 13 1
CHEESE SCHOOL (Axbridge):—					
Practical Section:—					
Students' Fees		196 0 0			281 17 0
Cheese and Butter sold (Autumn, 1891, draft from Frome School)		195 0 3			194 0 0
Do. do. (1892 drafts)		489 8 1			382 4 7
Government Grant for 1891		200 0 0			..
			1,080 8 4		858 1 7
Experimental Section:—					
Government Grant for 1891			150 0 0		
				1,230 8 4	
				15,833 17 1	15,364 8 1
RETURNED ON DEPOSIT ACCOUNT	..			..	500 0 0
BALANCE BROUGHT FORWARD, Jan. 1, 1892				213 15 7	96 13 0
				£16,047 12 8	15,961 1 1

CASH ACCOUNT—*continued*. CR.

PAYMENTS.	£ s. d.	1892. SWANSEA. £ s. d.	1892. SWANSEA. £ s. d.	1891. BATH. £ s. d.
Brought forward . . .		2,133 15 9	9,483 15 4	
UTTER SCHOOLS—*continued*.				
DORSET:—				
Teachers' Salaries and Expenses .	90 15 7			
Steward's Time and Expenses .	85 5 7			
Steward, on account	13 3 0			
Judges' Time and Expenses . .	13 15 11			
Secretary's Travelling Expenses .	1 16 3			
Office Staff	8 17 6			
Dairy Attendants	13 11 8			
Milk and Cream	30 8 4			
Coal, Salt, Ice, &c..	9 13 0			
Fittings	1 11 10			
Carriage of Plant	9 17 3			
Printing and Stationery . .	5 14 6			
Postages and Telegrams . .	4 17 10			
Prizes to Students . . .	28 2 6			
Purchase of Plant	31 7 3			
		348 18 0		
			2,482 13 9	1,554 18 2
HEESE SCHOOL (Axbridge):—				
PRACTICAL SECTION:—				
Teacher (including Board and Lodgings)	113 18 0			119 14 0
Steward's Time and Expenses .	44 1 4			60 15 2
Supervisor's Expenses . . .	13 0 0			10 10 0
Bailiff's Wages	41 15 0			44 0 0
Secretary's Travelling Expenses .	1 8 6			5 19 9
Office Staff	13 2 6			27 16 8
Milk	558 9 0			562 19 0
Rennet and Bandages	4 1 2			3 13 11
Coal, Salt, Ice, &c.	3 4 3			12 1 9
Printing and Stationery . . .	6 5 5			11 11 5
Postage and Telegrams	5 9 7			6 17 1
Advertisements	13 9 6			5 8 9
Students' Board	76 6 6			99 0 2
Purchase of Plant	59 8 3			7 16 8
Fittings	1 14 9			..
Carriage of Plant	1 10 10			..
Prize	..			10 0 0
		957 4 7	..	988 4 4
EXPERIMENTAL SECTION:—				
Scientific Expert (Time and Expenses)	203 5 0			65 19 0
Do. (1891)	25 0 0			..
Expert's Assistant Do. . . .	66 2 0			26 2 0
Board and Lodging of Do. . .	30 3 0			14 10 9
Chemist	15 0 0			15 0 0
Printing Results	51 8 6			..
Botanist	. .			2 3 0
		390 18 6		123 14 9
			1,348 3 1	1,111 19 1
			13,314 12 2	13,747 5 6
Investments			1,500 0 0	2,000 0 0
Cash on Deposit				1,000 0 0
Balance in Bank			1,233 0 6	213 15 7
		£	16,047 12 8	15,961 1 1

ereby certify that I have examined the foregoing accounts for the year 1892, compared the ts with the vouchers, and found them all in order and correct.

. 18*th*, 1893.

ALBERT GOODMAN, F.C.A.,
Auditor.

Passed by Council,
Jan. 31*st*, 1893.

THOS. F. PLOWMAN,
Secretary.

ASSETS AND LIABILITIES TO DECEMBER 31st, 1892, WITH COMPARISON FOR 1891

ASSETS.			1892. Swansea. £ s. d.	1891. Bath. £ s. d.
INVESTMENTS			19,500 0 0	18,000 0 0
	Par Value. £ s. d.	Actual Cost. £ s. d.		
New Zealand Stock	1,568 1 6	1,500 0 0		
Consols	3,001 4 0	3,209 19 6		
India Stock	8,000 0 0	7,790 0 6		
Canada Stock	1,790 13 4	2,000 0 0		
Queensland Stock	2,751 9 0	3,000 0 0		
N. S. Wales Stock	1,752 8 10	2,000 0 0		
	18,863 16 8	19,500 0 0		
CASH ON DEPOSIT AT BANK			500 0 0	500 0 0
PLANT (WORKS)		682 13 10		718 4 2
PLANT (SCHOOLS)		112 15 9		140 9 9
			795 9 7	859 3 11
SUBSCRIPTION ARREARS			144 19 0	117 18 0
INTEREST DUE ON BANK DEPOSIT			14 6 11	..
GOODS IN HAND (Cheese)			80 0 0	182 8 3
DUE ON WORKS ACCOUNTS			..	14 0 0
Do. SCHOOL ACCOUNTS			..	250 0 0
			21,034 15 6	19,923 10 2
Balance in Bank on Dec. 31, 1892			1,233 0 6	213 15 7
			£22,267 16 0	20,137 5 9
Balance brought down			£20,434 8 11	18,227 6 9

LIABILITIES.	1892. Swansea. £ s. d.	1891. Bath. £ s. d.
DEFERRED PRIZES.	55 0 0	59 0 0
GLOUCESTER MEETING	800 0 0	800 0 0
'JOURNAL,' cost of, estimated at	450 0 0	450 0 0
DUE TO COUNTY COUNCILS ON DAIRY SCHOOLS	528 7 1	586 19 0
OUTSTANDING ACCOUNTS, General	..	14 0 0
	1,833 7 1	1,909 19 0
Balance carried down	20,434 8 11	18,227 6 9
	£22,267 16 0	20,137 5 9

Annual Exhibitions.

Date.	Place visited.	Local Subscription.	President.
		£	
1852	Taunton	210	Lord Portman.
1853	Plymouth . . .	450	Sir T. D. Acland, Bart.
1854	Bath	450	William Miles, M.P.
1855	Tiverton	450	Earl Fortescue.
1856	Yeovil	450	C. A. Moody, M.P.
1857	Newton Abbot . .	700	Lord Courtenay.
1858	Cardiff	800	Lord Courtenay.
1859	Barnstaple . . .	800	John Sillifant.
1860	Dorchester . . .	900	Lord Rivers.
1861	Truro	900	J. W. Buller, M.P.
1862	Wells	900	Sir T. D. Acland, Bart.
1863	Exeter	900	Marquis of Bath.
1864	Bristol	1000	Earl Fortescue.
1865	Hereford	900	Lord Taunton.
1866	Salisbury	900	Earl of Portsmouth.
1867	Salisbury . . .	..	J. Tremayne.
1868	Falmouth . . .	900	Sir J. T. B. Duckworth, Bart.
1869	Southampton . .	900	Earl of Carnarvon.
1870	Taunton	900	Sir S. H. Northcote, Bart., C.B., M.P.
1871	Guildford . . .	900	Earl of Cork.
1872	Dorchester . . .	800	Duke of Marlborough, K.G.
1873	Plymouth . . .	800	Earl of Mount-Edgcumbe.
1874	Bristol	800	Sir Massey Lopes, Bart., M.P.
1875	Croydon	800	R. Benyon, M.P.
1876	Hereford	800	Earl of Ducie.
1877	Bath	800	Marquis of Lansdowne.
1878	Oxford	800	Earl of Jersey.
1879	Exeter	800	Earl of Morley.
1880	Worcester . . .	800	Earl of Coventry.
1881	Tunbridge Wells .	800	Marquess of Abergavenny.
1882	Cardiff	800	Lord Tredegar.
1883	Bridgwater . . .	800	Lord Brooke, M.P.
1884	Maidstone . . .	800	Viscount Holmesdale.
1885	Brighton	800	Viscount Hampden.
1886	Bristol	800	Lord Carlingford.
1887	Dorchester . . .	800	Earl of Ilchester.
1888	Newport (Mon.) . .	800	Lord Tredegar.
1889	Exeter	800	Lord Clinton.
1890	Rochester . . .	800	Earl of Darnley.
1891	Bath	800	Earl Temple.
1892	Swansea	800	Sir J. T. D. Llewelyn, Bart.
1893	Gloucester . . .	800	Lord Fitzhardinge.

PRIZE DONATIONS FROM MEMBERS AND OTHERS.

Date.	Name.	Classes in which Prizes were given.	Amount. £ s.
1857	Hood, Sir Alexander, Bart.	Cart Colt	10 0
1858	Acland, T. D. (now Sir T. D., Bart.)	Flannel	5 0
1858	Gray, Jonathan (deceased)	"	5 0
1858	Trevelyan, Sir W. C. (deceased)	Essay on Cider	25 0
1858	Williams, C. C.	Flannel and Implements	23 0
1859	Acland, Sir T. D., Bart. (deceased)	Stock	50 0
1859	Buller, J. W. (deceased)	Ponies	10 10
1859	Knight, F. W.	Exmoor Sheep	10 10
1859 to 1878	Miles, William (deceased)	Horse Shoeing	126 0
1859	Sillifant, J. (decd.)	Devon Bull	10 10
1864	Bristol Society of Merch. Venturers	Stallion	50 0
1869	Morrison, Alfred	Hampshire Down Sheep	8 0
1869	Portsmouth, Earl of	" " "	10 0
1871	Morrison, Alfred	" " "	6 0
1871	Portsmouth, Earl of	" " "	10 0
1872	Williams, Herbert (deceased)	Special Prize	10 0
1876	Moore-Stevens, J. C.	Honiton Lace	25 0
1878 to 1884	Morrell, G. H.	Langshan Poultry	42 0
1879	Marryatt, Horace	Honiton Lace	5 0
1879	Moore-Stevens, J. C.	" "	5 0
1882	Best, J. C., R.N.	Black Welsh Cattle	17 0
1884	Brassey, Henry Arthur, M.P. (deceased)	Dairy Cattle	50 0
1884	Le May, W. H. & H.	Hops (Plate)	25 0
1885	'Sussex Daily News'	Harness Horses	15 15
1885	Bristol, Marquis of	Stock (Silver Cup)	
1885	Trustees Brighton Race Stand	" "	67 0
1889	Tegetmeier, W. B.	Poultry (Silver Cup)	3 0
1889	Acland, C. T. D., M.P.	Butter	5 0

Date.	Name.	Classes in which Prizes were given.	Amount. £	s.
1889	Stanbury, J. H. . .	Butter	5	0
1889–90	'Field,' Proprietors of	Poultry (Silver Cups) . . .	6	0
1890	Le May, W. H. & H.	Hops (Plate)	26	5
1891	Lewis, W. & Son .	Stock and Dairy Produce . .	100	0
1892	Llewelyn, Sir J. T. D., Bart.	Butter Making (Silver Cup) . .	10	10

PRIZE DONATIONS FROM LOCAL COMMITTEES.

Date.	Place represented by Committee.	Classes in which Prizes were given.	Amount. £	s.
1859	Barnstaple . . .	Stock	85	0
1864	Bristol	"	106	0
1865	Hereford	"	358	0
1866–7	Salisbury. . . .	"	57	10
1869	Southampton . .	"	132	0
1871	Guildford . . .	"	110	0
1874	Bristol	"	403	0
1875	Croydon	"	245	0
1876	Hereford	"	381	0
1877	Bath	Stock and Dairy Produce . .	215	0
1881	Tunbridge Wells .	Stock	245	0
1882	Cardiff	"	200	0
1883	Bridgwater . . .	Stock and Dairy Produce . .	78	0
1884	Maidstone . . .	Stock and Hops	310	5
1885	Brighton	Stock	227	0
1886	Bristol	"	525	0
1888	Newport	"	100	0
1890	Rochester and Chatham	Stock and Hops	294	0
1891	Bath	Dairy Produce	50	0
1892	Swansea	Stock and Dairy Produce . .	200	0
1893	Gloucester . . .	" " " . .	400	0

PRIZE DONATIONS FROM SOCIETIES.

Date.	Name of Society.	Classes in which Prizes were given.	Amount. £	s.
1873	Devon Agricultural Society	Stock	400	0
1878	Oxfordshire Agricultural Society	„	170	10
1880	Worcestershire Agricultural Society	„	254	0
1881	Sussex Herd-Book Society	„	34	0
1882	Glamorganshire Agricultural Society	„	198	0
1884–5	Sussex Herd-Book Society	„	66	0
1885	Langshan Society	Poultry	3	3
1887	Dorchester Agricultural Society	Stock and Dairy Produce	112	12
1887–90	English Guernsey Cattle Society	Guernsey Cattle (Medals).		
1893	Do. do.	„ „ „	10	0
1887–93	English Jersey Cattle Society	Jersey Cattle (Medals).		
1892–93	Do. do.	Cattle	34	0
1890–93	Shropshire Sheep Breeders' Association	Shropshire Sheep	35	0
1891	Somerset Agricultural Association	Stock and Dairy Produce	103	0
1891–93	Hunters' Improvement Society	Brood Mares (Medals).		
1892	Glamorganshire Agricultural Society	Stock	100	0
1893	Shire Horse Society	Shire Mare or Filly (Medal).		

SPECIAL DONATIONS.

Date.	Name.	———	Amount. £	s.	d.
1853	Gray, Jonathan	Poultry Show Proceeds at Plymouth	282	16	0
1854	„ „	Poultry Show Proceeds at Bath	458	0	4

Bath and West and Southern Counties Society,

FOR THE

Encouragement of Agriculture, Arts, Manufactures, and Commerce.

List of Members.

CORRECTED TO JANUARY 31ST, 1893, INCLUSIVE.

PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

PRESIDENT

FOR 1892–93.

THE RIGHT HON. THE LORD FITZHARDINGE.

Names thus (*) distinguished are Governors.
Names thus (†) distinguished are Life Members.

*** *Members are particularly requested to make the Secretary acquainted with any errors in the names or residences.*

Name.	Residence.	Subscriptions. £ s. d.
†WALES, HIS ROYAL HIGHNESS THE PRINCE OF	Sandringham, Norfolk	..
*Abergavenny, Marquess of, K.G.	Eridge Castle, Tunbridge Wells	2 0 0
†Ackers, B. St. John	Huntley Manor, Huntley, near Gloucester	..
*Acland, Right Hon. Sir T. Dyke, Bart.	Killerton, Exeter	5 0 0
Acland, Alfred Dyke	38, Pont Street, Belgrave Square, London, S.W.	1 0 0
Acland, Charles T. D.	Killerton, Exeter	1 0 0
†Acland, A. H. Dyke, M.P.	Clynnog, Carnarvon	..
Acland, Sir Henry, K.C.B., M.D., &c.	Oxford	1 0 0
Adams, A.	Horner Farm, West Luccombe, Minehead	0 10 0
Adams, George	Royal Prize Farm, Pidnel, Faringdon, Berks	1 0 0
Adams, S. W., jun.	7, Boringdon Villas, Plympton St. Mary	1 1 0

Name.	Residence.	£	s.	d.
*Addington, Lord	Addington House, Winslow, Bucks.	2	2	0
Affleck, W.	Prospect House, Swindon	1	0	0
†Agate, Alfred	Broomhall, Horsham	..		
Aiken, J. C.	The Glen, Stoke Bishop, Gloucestershire	1	0	0
Alexander, D. T.	Cardiff	1	0	0
†Allen, Col. E.	...	..		
†Allen, James D.	Springfield House, Shepton Mallet	..		
Allen, Joseph	Chesterblade, Shepton Mallet	1	0	0
Ambrose, H.	3, Quiet Street, Bath	1	0	0
*†Amherst, Earl	Montreal, Sevenoaks	..		
Anderson, R.	Cirencester	1	0	0
Anglo-Bavarian Brewery Co.	Shepton Mallet	1	0	0
Anglo-Swiss Condensed Milk Co.	Chippenham	1	0	0
Archer, C.	Trelaske, near Launceston	1	0	0
†Arkwright, J. H.	Hampton Court, Leominster	..		
Armstrong, J. D.	Vallis Farm, Frome	1	0	0
*Ashburton, Lord	The Grange, Alresford, Hants	5	0	0
Ashby, William	East Dean, Eastbourne	1	0	0
Ashcroft, W.	Hayes, Beckenham, Kent	1	0	0
Ashe, J. W. L.	The Mount, Chislehurst	1	0	0
Ashford, E. C., M.D.	The Moorlands, Bath	1	0	0
Ashford, J.	Loxbeare, Tiverton	1	0	0
Asprey, F.	Somerset Villa, Bath	1	0	0
Aubrey, T.	19, Paragon, Bath	1	0	0
†Aveling, Thomas L.	Rochester	..		
Avon Manure Co.	St. Philip's Marsh, Bristol	1	0	0
Awdry, P. D.	Chippenham	1	0	0
Ayliffe, Arthur	Manor Dairy, Zeals, Bath	1	0	0
Ayre Bros.	The Avenue, High Street, Hull	1	0	0
Baber, S.	Elborough Farm, Locking, Weston-super-Mare	1	0	0
Badcock, H. Jeffries	Taunton	1	0	0
Badcock, W. L.	Wellington, Somerset	1	0	0
Bagnall, G.	Westwell, Burford, Oxon	1	0	0
†Baggs, M.	York Villa, Kensington, Bath	..		
Bailey, S.	Hornshay Farm, Wellington, Somerset	1	1	0
†Baillie, Evan	Filleigh, Chudleigh	..		
Bailwood, F. H. M.	Horsington, Wincanton	1	1	0
†Bainbridge, Captain W.	Beechwood, Sparkwell, Plympton	..		
Baker, F.	Manor Farm, Frindsbury, Rochester	1	0	0
Baker, G. E. Lloyd	Hardwicke Court, nr. Gloucester.	1	0	0
†Baker, L. J.	Chertsey Park, Surrey	..		
†Baker, Robert N. G.	Heavitree, Exeter	..		

Name.	Residence.	Subscriptions. £	s.	d.
Samuel, jun.	Sea Stud Farm, Ilminster	1	0	0
Thomas	Compton, Newbury, Berks	1	0	0
, T. H.	Mere Down, Mere	0	10	0
, William	Eastbury, Epsom Road, Guildford	1	0	0
William	Temple Street, Bristol	1	0	0
, W. S.	Vinesgate, Brasted, nr. Sevenoaks	1	0	0
Samuel	Westacott Nursery, Barnstaple	1	0	0
on, W. E.	Barvin, Potter's Bar, Herts.	2	2	0
tt, A. C.	Thirsk, Yorkshire	1	0	0
s, A.	Wolveton, Dorchester	1	0	0
ard, F.	Horsted Place, near Uckfield	1	0	0
m, G. T.	College Farm, Finchley	1	0	0
ett, Henry	Glympton Park, Woodstock	2	0	0
t, Major William	Moredon, North Curry, Taunton	1	0	0
, John	Hackwood Farm, Basingstoke	1	0	0
lot, Major Walter	Coates, Pulborough, Sussex	1	1	0
tt, C. H.	Pilton House, Barnstaple		. .	
ard, Baldwin J. P.	Kitley, Yealmpton, Ivybridge	2	0	0
and Wells, The Right v. The Bishop of	The Palace, Wells	1	1	0
h, Marquess of	Longleat, Warminster		. .	
Gas Co.	Bath	1	0	0
urst, Earl	Cirencester House, Cirencester	2	0	0
A.	Westown, Bristol	1	0	0
ns, G. B.	Kilworthy, Tavistock	1	0	0
, E. C., F.R.S.E.	Thornfalcon, Taunton	1	0	0
-Pooll, R. H.	Road Manor, Bath	1	0	0
ishill, W. J.	St. Loyes, Exeter		. .	
on, Edward	Broadway, Dorchester	1	0	0
y, R.	Torr Grove, Plymouth		. .	
e, W.	Brock Hill, Broadclyst, Exeter	1	0	0
e, William	Larking's Farm, Chiddingstone, Edenbridge, Kent		. .	
champ, E. B.	Trevince, Scorrier, Truro	1	0	0
champ, W.	Stratton House, Stratton-on-the-Fosse, Bath	1	0	0
oy, M. H., M.P.	Coombe Priory, Shaftesbury	1	0	0
ld, J. F.	Primley Hill, Paignton, Torquay	1	0	0
J. W.	Gillingham, Dorset	1	0	0
ett-Stanford, V. F.	Pyt House, Salisbury		. .	
tt, H. M.	Sparkford, near Yeovil	1	0	0
ett, Jas.	Little Box Farm, Awre, Newnham, Gloucestershire	1	0	0
tt, Jos.	Down House, Dursley, Glos.	1	0	0
tt Brothers	*Journal* Office, Salisbury	1	1	0
ed, W.	Bourley Farm, Sandling, Maidstone	1	0	0
ll, Edward Hammond, & .	Heybridge, Maldon, Essex	1	0	0
on, R.	Englefield House, Reading	5	0	0
R.	Milverton, Somerset	1	0	0
ge, R. J.	Somerton, Oxon	1	0	0
an, J.	Moredon Farm, Swindon	1	0	0

Name.	Residence.	Subscriptions. £ s. d.
*†Bertie, Lord	Uffington House, Stamford	. .
*†Best, Capt. John C. (R.N.).	Plas-yn-Vivod, Llangollen	. .
† Best, Col. George	Charlton House, Ludwell, Salisbury	. .
Best, Major M. G.	Park House, Boxley, Maidstone.	1 0 0
Best, Captain T. G.	Abbotts Ann, Andover.	1 0 0
Bickle, R.	Bradstone Hall, Tavistock.	1 0 0
Bigg, Thomas	Leicester House, Great Dover Street, London, E.C.	0 10 0
Birmingham, C.	Holnicote, near Minehead	0 10 0
Biscoe, H. S. T.	Oakhanger, Godalming, Surrey.	1 0 0
Blackstone and Co. (Limited)	Rutland Iron Works, Stamford, Lincoln	1 1 0
Blake, Abel	Loxbeare, Tiverton	0 10 0
Blake, William	Bridge House, Ilminster, South Petherton	1 0 0
Blinman, H. T.	Parsonage Farm, Farrington Gurney, Bristol	0 10 0
Blundell, R. C.	Benhams, Horley, Surrey	1 0 0
Blyth, J.	Pantheon, Oxford Street, London	1 0 0
Boby, Robert	Bury St. Edmunds, Suffolk	1 0 0
Bodman, G.	Park Farm, Yatton	1 0 0
Bolitho, T. B., M.P.	Treridden, Penzance	1 0 0
†Bond, N.	Creech Grange, Wareham, Dorset	. .
*Boteler, Capt. W. J. Casberd	The Elms, Taplow	2 0 0
Boucher, Rev. A. F.	Kempsey Manor, Worcester	1 0 0
†Boughton-Knight, A. R.	Downton Castle, Ludlow	. .
Bound, William	Hurstborne, Tarrant, Andover	1 1 0
Bourne, C. H.	Wellington Road, Dudley	1 1 0
Bouverie, Hon. D. P.	Coleshill House, Highworth	1 1 0
Bouverie, H. P.	Brymore, Bridgwater	1 0 0
†Bouverie, W. P.	Little Cheverill, Devizes	. .
†Bowen-Jones, J.	Ensdon House, Montford Bridge.	. .
†Bowerman, Alfred	Capston, Williton	. .
Boys, T. H.	Bridgwater	1 0 0
Bradburne, T.	Astwood Hill, Redditch	1 0 0
Bradford, J.	Yeovil	1 0 0
Bradford, Thos., and Co.	Salford, Manchester	1 0 0
†Braikenridge, John Herman.	The Rookery, Chew Magna, Bristol	. .
Braikenridge, W. J.	Newton House, Clevedon, Somerset	1 1 0
Brand, A.	80, Victoria Street, London, W.	1 0 0
†Brassey, A.	Heythrop, Chipping Norton, Oxon	. .
†Brassey, H. L. C.	Preston Hall, Aylesford, Kent	. .
Brendon, G.	Broomhill, Stratton, North Devon	1 0 0
Bridgman, —	Ham Farm, Nailsea, Bristol	1 0 0
Bristol Wagon Works Company (Limited)	Lawrence Hill, Bristol	1 1 0
Broadmead, T. Palfrey	Enmore Park, Bridgwater	1 0 0
Brock, J. C.	High Ridge Farm, Dundry, Bristol	1 0 0
Brock, S.	Newhall, Broad Clyst, Exeter	1 0 0

Name.	Residence.	£	s.	d.
Brockman, F. D.	Beach Borough, Hythe, Kent.	1	0	0
Broderip, E.	Cossington, Somerset	1	0	0
Brodie, Sir B. V. S., Bart.	Brookham Warren, Betchworth	1	0	0
*Brooke, Lord, M P.	Easton Lodge, Dunmow	2	2	0
Brown and Co.	Salisbury	1	0	0
Brown, James	Shepton Mallet	1	0	0
Brown, William Jeffery	Middlehill House, Box, Wilts	1	0	0
Browne and Co.	Bridgwater	1	0	0
Browne, Solomon	Barton, Landrake, Devonport	0	10	0
Browne, W. J.	Buckland Filleigh, Highampton	1	0	0
*Bruce, W. A.	96, Sydney Place, Bath	2	0	0
Brune, C. G. Prideaux	Prideaux Castle, Padstow	1	0	0
Brutton, J.	7, Princes Street, Yeovil	1	0	0
Bryant, Messrs.	St. Philip's Marsh, Bristol	1	1	0
†Bryce, J. P.	Bystock, near Exmouth		..	
†Brymer, William E., M.P.	Ilsington House, Dorchester		..	
Buck, A.	Worcester	1	0	0
†Buckingham, Rev. F. F.	The Rectory, Doddiscombsleigh, Exeter		..	
Buckingham, W.	Southernhay, Exeter	1	0	0
Bucknell, B.	Holcombe Rogus, Wellington, Somerset	1	0	0
Budd, H. A.	Shepton Mallet	1	0	0
Budgett, W. E.	Stoke Bishop, near Bristol	1	0	0
†Buller, Admiral A.	Erle Hall, Plympton		..	
Bulteel, John	Pamflete, Ivybridge	1	0	0
Buncombe, E. A.	Coombe Florey, Taunton	1	0	0
Burbidge, Charles	Chitterne St. Mary, Codford, Wilts	1	0	0
Burbidge, Edwin	South Wraxall, Bradford-on-Avon	1	0	0
Burbidge, W.	Chippenham	1	0	0
Burge, William	Stoke Farm, Charles, South Molton	0	10	0
Burnard, R.	Sutton Road, Plymouth	1	0	0
Burnett, H.	Sperrings Farm, Clapton, Portishead, Bristol	1	0	0
Burnett, J.	Island House, Highbridge	1	0	0
†Burrell, Sir C. R., Bart.	Knepp Castle, Sussex		..	
Burrow, G.	Manor Farm, South Marston, Swindon	1	1	0
Bush, B.	Manor Farm, Laverton, Bath	1	0	0
†Bush, J. D.	Bath		..	
Bush, R. H.	Ellaston, Atlantic Road South, Weston-super-Mare	1	0	0
Buss, E.	Elphicks, Horsmonden, Kent	1	0	0
Buswell, C.	Torquay	1	0	0
Butcher, G., & Co.	Bath	1	0	0
Butler, H.	1, Abbey Park, Keynsham	1	0	0
Butterworth, R. W.	Percy House, Kensington, Bath	1	0	0
Calmady, V. P.	Tetcott, near Holsworthy, Devon	1	0	0
*Calthorpe, Lord	Elvetham Park, Winchfield	2	0	0

Name.	Residence.	Subscriptions. £	s.	d.
Calvert, Col. A. M.	Ockley Court, Dorking	1	0	0
Campbell, C. Lee	Glewstone Court, Ross	1	0	0
Campion, W. H.	Danney, Hassocks, Sussex	1	0	0
Candy, T. C.	Woolcombe, Cattistock, Dorset	1	0	0
Cannon, H.	Milton Clevedon, Evercreech	1	0	0
Caple, J.	Beach Farm, Bitton, Gloucestershire	1	0	0
Capon, G. C.	63, Mortimer Street, London, W.	1	0	0
*Carew-Gibson, G. C.	Kingsfold, Billingshurst, Sussex	2	0	0
*Carlingford, Lord	The Priory, Chewton Mendip, near Bath	2	2	0
Carson and Sons	Grove Works, Battersea, London, S.W.	1	1	0
Carson and Toone	Warminster	1	0	0
†Carter, E.	Puckpool House, Ryde, Isle of Wight	..	..	
Carter, J., and Co.	238, High Holborn, London	1	1	0
†Carter-Wood, Joseph		..	..	
†Cartwright, F. F.	7, Percival Road, Clifton	..	..	
Cary, Edmund	Pylle, Shepton Mallet	0	10	0
†Cary, W. H.	Steeple Ashton, Trowbridge	..	..	
Cater, R. B.	Bath	1	1	0
Cater, Stoffell and Fortt, Ld.	Bath	1	0	0
Cathedral Dairy Co.	Exeter	1	0	0
†Catt, C. W.	52, Middle Street, Brighton (Hon. Local Sec., 1885)	..	..	
*Cawdor, Earl of	Stackpole Court, Pembroke	2	0	0
Cay, A.	Woodside, Kenilworth	1	0	0
Cecil, Lord A.	Orchardmains, Tunbridge	1	0	0
Cecil, Lord L.	Orchardmains, Tunbridge	1	0	0
Chaloner, Capt. R.	Sedgehill House, Semley, Wilts	1	0	0
Chamberlain, Pole, and Co.	Bristol	1	0	0
Champion, S. H.	Newbery Farm, Kilmersdon, Bath	1	0	0
Channon, J.	Wishford, Broad Clyst, Exeter	1	0	0
†Chapman, C.	Carlecotes Hall, Dunford Bridge, near Sheffield	..	..	
Chapman, G.	Radley, near Hungerford, Berks	1	1	0
Chapman, Rev. H.	Donhead St. Andrew, Salisbury	1	0	0
Chapman, W. W.	Estate Office, Wadhurst Park, Hawkhurst, Sussex	1	0	0
Chard, T. T.	Dungarvan, Downleaze, Stoke Bishop	1	1	0
Charles, W.	Breedy, Bridport	1	0	0
Chichester, C.	Kenn, near Exeter	1	0	0
Chick, John	Compton Valence, Dorchester	1	0	0
Chorley, W. L.	Quarme, Dunster, Somerset	1	1	0
Chown, Richard	Holcombe Farm, Exbridge, Tiverton	0	10	0
Churchouse, A.	Westholme, Shepton Mallet	1	0	0
Clark, Isaac	West Lynch, Selworthy	1	0	0
Clark, James	Street, Glastonbury	1	0	0

Name.	Residence.	£	s.	d.
†Clark, J. J.	Goldstone Farm, West Brighton (Hon. Local Sec., 1885)		..	
Clark, W. S.	Street, Glastonbury	1	0	0
Clarke, Joshua	Minehead	1	0	0
†Clarke, T. E.	Parks, Minehead		..	
Clarke, W.	East Lynch, near Minehead, Somerset	1	0	0
Clayden, H.	Northoe, Park View, Hoddesdon	1	1	0
*Clayton, Shuttleworth, and Co.	Lincoln	2	2	0
Cleall, S.	Berwick, Bridport	1	0	0
Cleave, B. C.	Sanctuary, Crediton, Devon	1	1	0
Cleave, W. C.	Sanctuary, Crediton, Devon	1	1	0
Clerk, Edmund H.	Burford, Shepton Mallet	1	0	0
†Clifford, Lord	Ugbrook, Chudleigh		..	
Clifton, J. H.	Upland House, Keynsham, Bristol	1	1	0
*Clinton, Lord	Heanton Satchville, Beaford, North Devon	2	2	0
Clothier, Frederick	Bristol Road, Weston-super-Mare	0	10	0
Clout, R.	Brome House, West Malling, Kent	1	0	0
Clutton, Henry	Hartswood, Reigate	1	0	0
Clutton, John	3, Sussex Sq., Hyde Park, London	1	0	0
Clutton, Robert Geo.	9, Whitehall Place, London	0	10	0
Clutton, R. W.	Doner's Lodge, Reigate	1	0	0
Coates, S. B.	Stanton Drew Court, Pensford	1	0	0
Cobb, H. M.	Higham, Kent	1	0	0
Cobb, R. L.	Higham, Kent	1	0	0
Cock, George	12, South Street, South Molton	0	10	0
Cockey and Sons	Frome Selwood	0	10	0
Coleman, W. T.	Langley Fitzurse, Chippenham	1	0	0
Cole, T.	Stock Farm, Langford, Somerset	1	0	0
Coles, R.	Middleton, Norton Bavant, Warminster	1	0	0
Coles, C. and T.	Manor House, Winterbourne Stoke, Salisbury	1	0	0
Colfox, W.	Westmead, Bridport	1	0	0
Collins, C. R.	Strathculm, Hele, Cullompton	1	1	0
Collins, D.	Newton Ferrars, Carrington, Cornwall	1	0	0
Colman, J. J., M.P.	Carrow House, Norwich	1	1	0
Colmer, Jas.	Redland Knoll, Bristol	1	1	0
Colthurst, Symons, and Co.	Bridgwater	1	0	0
*Combe, R. H.	Pierrepont, Farnham	2	0	0
*Combe, R. T.	Earnshill, Curry Rivell, Taunton	2	0	0
Coney, Herbert F.	The Poplars, Pucklechurch, Bristol	1	0	0
Cook, N.	Chevithorne Barton, Tiverton	1	0	0
†Cookson, H. T.	Sturford Mead, Warminster		..	
Cooling, G., and Son	Northgate Street, Bath	1	1	0
Coombs, G.	Radstock, near Bath	1	0	0
Coombs, Joseph	Radstock, Bath	1	0	0
Cooper, G.	Branscombe, Axminster	0	10	0
Cooper, G. H.	Inglesham Dairy, Lechlade	1	0	0
Cooper, P. N.	Westbury-on-Trym, Bristol	1	0	0

Name.	Residence.	Subscriptions. £	s.	d.
†Cooper, P. W. D.	99, Pembroke Road, Clifton		..	
Corbett, J. R.	More Place, Betchworth, Surrey.	1	0	0
Corbett, J. S.	Cogan Pill, near Cardiff	1	1	0
Corbett, Thomas	Perseverance Iron Works, Shrewsbury	1	0	0
*Cork and Orrery, The Earl of	Marston, near Frome	2	2	0
†Corner, H. W.	Manor House, Inglescombe, Bath		..	
Cornish, H. J.	Thornford, Sherborne	1	0	0
Cornish, W. T.	Abbey Churchyard, Bath	1	1	0
†Cornwallis, F. S. W.	Linton Park, Maidstone		..	
Cory, R.	Langdon Court, Plymouth	1	0	0
Cotterell, W.	Derry Ormond Park, Cardigansh.	1	0	0
Cotton, Col., the Hon. R. S.	Somerford Hall, Brewood, Staffs.	1	0	0
Courtenay, Hon. H. L.	Fox, Fowler's Bank, Exeter	1	0	0
†Coussmaker, Lieut.-Col. G.	Westwood, Guildford, Surrey		..	
*Coventry, The Earl of	Croome Court, Severn Stoke, Worcestershire	2	0	0
Cox, James	High Littleton, Bath	1	0	0
Crane, James	Torpuddle, Dorchester	1	0	0
Crawshay, W. T.	Cyfarthfa Castle, Merthyr Tydvil	1	0	0
Crick, Thomas	Great Ash, Winsford, Dulverton	0	10	0
Crookes, J. W.	Hayston Hall, Haverfordwest	1	0	0
Crutchley, P. E.	Limminghill Lodge, Ascot	1	0	0
†Cubitt, Rt. Hon. Geo., M.P.	Denbies, Dorking		..	
Culverwell, Bros.	Durleigh Farm, Bridgwater	1	0	0
Cuming, A. P.	Moreton Hampstead, Devon	1	0	0
Cundall, H. M., F.S.A.	Richmond, Surrey	1	0	0
Custance, Mrs. M.	Brook Heath, Breamore, Salisbury	1	0	0
Cutcliffe, G.	Coombe House, Witheridge, N. Devon	1	0	0
Dairy Supply Company	Museum St., Bloomsbury, London	1	0	0
Dalgety, Frederick G.	Lockerley Hall, Stockbridge, Hants	1	0	0
†Damer, Capt. G. Dawson	Came, Dorchester		..	
Damerel & Son	161, Sidwell St., Exeter	1	0	0
Dampney, G. D.	Hinton, Ilchester	1	0	0
Dancey, T.	Melksham	1	0	0
Danger, Thomas	Rowford Lodge, Taunton	1	0	0
Daniel, Rev. H. A.	Manor House, Stockland, Bridgwater	1	0	0
†Daniel, H. T.	Manor House, Stockland, Bridgwater		..	
Daniel, Thos. C.	Stoodleigh, Tiverton	1	1	0
Darby, A. E. W.	Little Ness, Shrewsbury	1	0	0
Darbyshire, C.	17, Tow Park, Riversdale, Ilfracombe	1	0	0
Darby, E.	Liscombe, Dulverton	1	0	0
*Darnley, Earl of	Cobham Hall, Gravesend	5	0	0

Name.	Residence.	Subscriptions. £	s.	d.
ney, Lieut.-Col.	The Beacon, Kingswear, South Devon	1	1	0
nport, Rev. George	Foxley, Hereford		. .	
y, J. Sydney	Brockym House, Helston, Cornwall		. .	
', Sleep, and Co.	Excelsior Plough Works, Plymouth	1	0	0
, T.	Beere Manor Farm, Cannington, Bridgwater	1	0	0
s, J. N.	Gweleath, Cury, R.S.O., Cornwall	1	0	0
Arthur J.	Farncombe Farm, Doulting, Shepton Mallet	1	0	0
H. J.	Doulting, near Shepton Mallet	1	0	0
', W.	Tracy Park, Bath		. .	
W. H.	Chelwood House, Pensford, near Bristol	1	0	0
, R. R. M.	Spurbarne, Exeter	1	0	0
n, Hon. R.	Holne Park, Ashburton	1	0	0
n, W. and F.	Market Place, Bath	1	0	0
John	Huxham, E. Pennard, Shepton Mallet	1	0	0
Son, and Hewitt	22, Dorset St., Baker St., London		. .	
on, W. A.	20, Birchin Lane, London, E.C.		. .	
S.	Newport, Mon.	1	0	0
roke, Lord Willoughby	Compton Verney, Warwick		. .	
tto, Col.	Brook Lodge, Holm Wood, Dorking, Surrey	1	0	0
Mare, H.	Bradley Head, Milborne Wick, Sherborne	1	0	0
[urrieta, A.	Wadhurst Park, Hawkhurst, Sussex		. .	
, R.	West of England Annato Works, Bishop's Sutton, Bristol	1	1	0
, Rev. Samuel	Lattiford House, Wincanton	1	0	0
g, C., and Co.	Chard, Somerset	1	0	0
n, Rev. Archdeacon	East Brent, Somerset	1	1	0
itre, H. Denis	Charlton House, Wantage		. .	
nshire, Duke of, K.G.	Chatsworth, Derbyshire	5	0	0
son, A.	Kingweston, Somerton, Somerset	1	0	0
son, W.	121, St. George's Square, Pimlico, London, S.W.	1	1	0
n's, Limited	Chester	1	1	0
', Lord	Minterne, Cerne Abbas		. .	
, J. K.	Sherborne Castle, Sherborne	1	0	0
, J. K. W.	Sherborne Castle, Sherborne	1	0	0
, C. B.	Marwell Manor, Fair Oak, near Southampton	1	0	0
G., & Sons	Victoria St., Bristol	1	0	0
gton, R. M.	Horsington House, Templecombe	1	1	0
gton, T. Marriott	Horsington, Yeovil	1	1	0
T. C.	Gunton Old Hall, Lowestoft, Suffolk	1	0	0
', James	Cutsey Trull, Wellington	1	0	0

Name.	Residence.	£	s.	d.
†Druce, A. F. Milton	Fyfield, Abingdon, Berks		..	
*Ducie, Earl of	Tortworth Court, Falfield, R.S.O., Glos.	2	0	0
Duckering, C. E.	Whitehoe, Kirton Lindsey	1	0	0
†Duckham, T.	Halmer, Hereford		..	
Duckworth, R.	The Cloisters, Bath	1	0	0
*Duckworth, Rev. W. A.	Orchardleigh Park, Frome	2	0	0
Dugdale, Major A. G.	Stock House, Sturminster Newton	1	0	0
†Dunboyne, Lord	Greendale, Clyst St. Mary, Exeter		..	
†Dungarvan, Viscount	40, Charles Street, London		..	
Dunn, William	Frome	1	0	0
†Durrant, Edward	Tunbridge Wells (Hon. Local Sec. 1881)		..	
Dyer, J.	Corn merchant, Swansea	1	0	0
Dyke, Thomas	Long Ashton Lodge, Clifton, near Bristol	1	0	0
*Dyke, Rt. Hon. Sir W. Hart, Bart., M.P.	Lullingstone Castle, Eynsford	2	2	0
†Dymond, Edward E.	Oaklands, Apsley Guise, Woburn		..	
Dymond, Francis W.	Exeter	1	0	0
Eames, T. P.	Cotley Farm, Chard	0	10	0
Easton, Richard	Heale Mount, Taunton	1	0	0
†Edgcumbe, E. R. Pearce	Somerleigh, Dorchester		..	
Edgington, Benjamin (Limited)	2, Duke Street, London Bridge	1	0	0
†Edmondson, A.	Tubney Warren Farm, Abingdon		..	
*Edwards, C. L. Fry	The Court, Axbridge, Somerset	2	0	0
Edwards, A. P.	Hutton, Weston-super-Mare	1	0	0
Edwards, Jas.	Belmont, Flax Bourton, nr. Bristol	1	0	0
†Egmont, Earl of	Cowdray Park, Midhurst, Sussex		..	
Eldridge, Pope and Co.	Dorchester	1	0	0
*Ellesmere, Earl of	Worsley Hall, Manchester	2	0	0
*Elliot, H. E. Tracey	Leigham House, Plympton	2	2	0
Elliott, F. M.	Biddestone, Chippenham	1	0	0
Ellis, E.	Summersbury Hall, Shalford, near Guildford	1	0	0
Ellis, J.	Maidstone	1	0	0
*Elton, Sir E., Bart.	Firwood, Clevedon	2	2	0
Elwes, P. F. C.	Somerton, Somerset	1	0	0
Elworthy, Charles	Stone Farm, South Molton	1	0	0
Enys, F. G.	Enys, Penryn, Cornwall	1	0	0
Ernst, Major Henry	Wescombe House, Evercreech, Bath	1	0	0
Esdaile, C. E. T.	Cothelstone House, Taunton	1	0	0
Evans, Daniel	Winsford, Dulverton	0	10	0
†Evans, Sir David	Ewell Grove, Surrey		..	
Evans, Evan	Glanywern, Talsarn, South Wales	1	0	0
Evans, F.	Langley Lodge, Chippenham	1	0	0

Name.	Residence.	Sub-scriptions. £	s.	d.
Evans, H. J.	Greenhill, Whitchurch, Cardiff	1	0	0
Evans, W. H.	Ford Abbey, Chard	1	0	0
†Evan-Thomas, Commander A.	Cae Rwnon, Builth	..	..	
Farthing, Herbert	Thurloxton, Taunton	1	0	0
Farwell, Capt. W.	The Priory, Burnham, Bucks.	1	0	0
†Farwell, F. Geo.	Laura Place, Bath	..	..	
Faunce de Laune, C. de L.	Sharsted Court, Sittingbourne	1	0	0
Fellows, J. H.	Kingston Park, Dorchester	1	0	0
Fenn, T.	Ludlow Estate Offices, Downton Castle, Bromfield, Salop	1	0	0
Ferris, G.	Milton Manor, Pewsey, Wilts	1	0	0
Ffooks, Thos.	Totnell Corner, Sherborne, Dorset	1	0	0
*Field, Barclay	26, Hill Street, Berkeley Square, London	2	2	0
Fife, Capt. W.	Langton Hall, Northallerton, Yorks.	1	1	0
File, C.	Elham, Canterbury	1	0	0
Filliter, F.	St. Martins House, Wareham.	1	0	0
*†Finch, C. H. M.	Salisbury	..	..	
Finlay, Alexander	Little Brickhill, Bletchley, Bucks	1	0	0
Firth, F. H.	Cator Court, Ashburton	1	0	0
Fish, George J.	Selworthy, Taunton	1	0	0
Fisk, J. R.	Brightstone, Isle of Wight.	1	0	0
†Fitzhardinge, Lord	Berkeley Castle, Gloucestershire.	..	..	
Fletcher, C. E.	Kenward, Yalding, Maidstone	1	0	0
†Fletcher, Lionel J. W.	Ewell Manor, West Farleigh, Maidstone	..	..	
†Flower, George F. Applin	The Buildings, Stafford Farm, Dorchester	..	..	
Flower, James	Chilmark, Salisbury	1	0	0
Flower, R. F.	The Hill, Stratford-on-Avon	1	0	0
Flower, Rev. W.	Worth Vicarage, Dover	1	1	0
Foley, Son & Mundy	Trowbridge	1	0	0
*Ford, Henry	Lower House, Branscombe, Axminster	2	2	0
Ford, A.	Wraxall Court, Nailsea, near Bristol	1	0	0
Ford, Major A. E.	4, Orme Square, Hyde Park, London	1	0	0
*†Forester, Capt. F. W.	Croom House, Croom, Co. Limerick	..	..	
Forster, Stuart	Postlip Hall, Winchcombe, Glos.	1	1	0
Forster, W. S.	Gore Court, Maidstone	1	0	0
*Fortescue, Earl	Castle Hill, South Molton	2	0	0
Foster, R. L.	Wells, Somerset	1	0	0
Foster Bros.	The Oil Mills, Gloucester	1	1	0
Foster, W.	Ripple Vale, Deal, Kent	1	1	0
Fowler and De la Perrelle	Gloucester Square, Southampton	1	0	0
Fowler, Richard	Broughton, Aylesbury	1	0	0

Name.	Residence.	Subscriptions. £ s. d.
Fowler, W. H.	Taunton.	1 0 0
Fox Brothers and Co.	Wellington, Somerset	1 0 0
Fox, C. L.	Shute Lodge, Wellington. Somerset	1 0 0
Fox, Dr.	16, Gay Street, Bath	1 1 0
†Fox, Robert	Falmouth	. .
Foxcroft, E. T. D.	Hinton Charterhouse, Bath	1 1 0
Francis, William	Winstout, Crediton	0 10 0
†Franklen, Col. C. R.	Clemenstone, Bridgend	. .
Freeman, H. W., M.D.	24, Circus, Bath	1 1 0
Freeman, J.	Rhayader	1 0 0
Freeth and Pocock	74, Wandsworth Road, London	1 0 0
Fricker, J. A.	Burton, Mere, Wilts.	1 0 0
Froom, Robert	Broad Clyst, Exeter	1 0 0
Fry, H. A.	19, Monmouth Place, Bath	1 0 0
Fry, W.	Stoney Stratton, Evercreech	1 0 0
†Fryer, William Rolles	Verwood Manor, Salisbury	. .
Fuller, E. R.	The Hill, Batheaston	1 1 0
†Fuller, G. Pargiter, M.P.	Neston Park, Corsham	. .
*Fuller, J. M.	Neston Park, Corsham	2 0 0
Fuller, S. and A.	Bath	1 0 0
Fursdon, Charles	Fursdon, Tiverton, Devon	1 0 0
†Galloway, W. G.	Cridland Farm, Spaxton, Bridgwater	. .
Gammin, Joseph	West Holwell, Parncombe, N. Devon	1 0 0
Gardiner, Sons & Co.	Nelson Street, Bristol	1 1 0
Gardner, Adam	Butsper, Launcells, Holsworthy	0 10 0
Gardner, Rt. Hon. H. C., M.P.	4, Whitehall Place, London	1 0 0
Gardner, W.	Chippenham	1 0 0
*Garratt, Lt.-Col. T. A. T.	Bishop's Court, Exeter	2 2 0
Garth, T. C.	Haines Hill, Twyford	0 10 0
Gear, W. H.	Union Street, Bath	1 1 0
Geare, John	Exeter	1 1 0
*†George, William E.	Howe Croft, Stoke Bishop, Bristol	. .
Gerrish, J.	Chipping Sodbury	1 0 0
†Gibbons, G.	Denman St., Borough High St., London, S.E.	. .
Gibbons, George	Tunley, near Bath	1 0 0
Gibbons, J. V.	Haseley Iron Works, Tetsworth, Oxon	1 0 0
*†Gibbs, Antony.	Tyntesfield, Bristol	. .
†Gibbs, H. M.	Barrows Court, Flax Bourton, R.S.O., Somerset	. .
Gibbs, Jas., and Co.	Corn Exchange Buildings, Mark Lane Station, London, E.C.	1 0 0

Name.	Residence.	£	s.	d.
ı, Denston	Metchley, Barlow's Road, Edgbaston, Birmingham	1	0	0
l, Samuel L.	253, High Street, Exeter	0	10	0
r, W.	Cambridge House, Regent's Park, London	1	1	0
P. B.	The Quinton, Brobury, nr. Hereford	1	0	0
S.	17, Stall Street, Bath	1	0	0
Frederick	Speenhamland, Newbury	1	1	0
Alfred	St. James Street, Brighton.	1	1	0
g-Gilling, Capt. T.	Manor House, Bathford, near Bath	1	0	0
stone, J.	Bowden Park, Chippenham		. .	
r, W., & Sons (Limited).	Warwick	1	0	0
, Sir Richard G., Bart.	Gaunt's House, Wimborne	2	2	0
ı, W. A.	Seagrove, Sea View, Isle of Wight	1	0	0
rd, A. L.	The Lawn, Swindon	1	0	0
nan, C. B.	Woldringfold, Horsham.		. .	
an, Capt. J.	Park Hatch, Godalming	1	0	0
ney, G. Prior	Derriads, Chippenham		. .	
ey, Sir G., Bart.	Beechfield, Corsham	1	0	0
en, J. R. P.	Compton House, Sherborne	1	0	0
ord, A. J.	Chilton Cantels, Ilchester	1	0	0
ord, Rev. M. C.	Chilton Cantels Rectory, Yeovil	1	0	0
nan, A.	3, Hammett Street, Taunton	1	0	0
Langton, W. F.	2, Princes Gate, London, W.	1	0	0
g, C.	Wiston Park, Steyning	1	0	0
ng, Rev. John	Wiston Park, Steyning	2	2	0
inge, Hugh	Kingston-by-Sea, Brighton		. .	
nge, W. H.	Kingston-by-Sea, Brighton	1	0	0
en, Right Hon. G. J.,	69, Portland Place, London, W.	1	0	0
m, George	The Oaklands, Birmingham	1	0	0
, W. J.	Bassaleg, Newport, Mon.	1	0	0
', Mrs.	28, Broadwater Down, Tunbridge Wells	2	2	0
n, H. L.	Ville Amphrey Farm, St. Martin's, Guernsey		. .	
, R.	The Whittern, Kington, Herefordshire	1	0	0
slade, W. R. J.	Fairfield, Trull, Taunton	1	0	0
ry, G. B., M.P.	Boarzell House, Hurst Green, Sussex	1	0	0
ry, T. C.	Combe Hill House, Radstock, Bath	1	0	0
ell, Arthur R.	4, Savile Row, London, W.	1	0	0
tone, S. W.	Backwell Hill House, Backwell, Bristol	1	0	0
ı, B.	New House, Broad Clyst, Exeter	1	0	0
ı, J.	Portway House, Ken, Yatton.	1	0	0
, Sir T. Fraser, Bart.,	Fern House, Salisbury	1	0	0
st, Merthyr)	Inwood, Henstridge, Blandford		. .	

Name.	Residence.	Subscriptions. £	s.	d.
Guise, Sir W. F. G., Bart.	Elmore Court, Gloucester	1	0	0
Gulley, H. J.	Rodber House, Wincanton	1	0	0
Gunning, G. H.	Feltham Farm, near Frome	1	0	0
Guyon, Rev. H. C.	The Rectory, Lamyat, Bath	1	0	0
†Hall, J. F.	Sharcombe, Wells, Somerset	..		
Hall, T. Farmer	2, Observatory Gardens, Kensington, London	1	0	0
Hall, W. J.	Coventry Farm, Wroughton, Swindon	1	0	0
Halsey, E. J.	Pirbright, Woking Station, Surrey	1	0	0
Ham, J., jun.	Broadclyst, Exeter	0	10	0
Ham, William	Worridge, Collumpton	0	10	0
†Hambro, Everard A.	Hayes Place, Beckenham, Kent	..		
Hamilton, Hon. Mrs. A. B.	Combs, Stowmarket	1	0	0
Hammett, F. D.	Hollises House, Chepstow Road, Newport, Mon.	1	0	0
Hammond, A.	Royal Crescent, Bath	1	0	0
Hanbury, S.	Bishopstowe, Torquay	1	0	0
Hancock, Rev. F.	Selworthy, Somerset	1	0	0
Hancock, G. D.	Halse, Taunton, Somerset	1	0	0
Handley, J.	Green Head, Milnthorpe, Westmoreland	1	0	0
*Handley, Rev. E.	Bath	2	0	0
Hanley, C. A.	Queen St., Oxford	1	0	0
Hannam, R.	Boarsburrow Farm, Loders, Bridport	1	0	0
Harbord, Rev. H.	East Hoathley Rectory, Hawkhurst, Sussex	1	0	0
Harbottle, E.	Topsham	1	0	0
Harding, H. R.	Studley House, Wanstrow, Frome	1	0	0
Harding, T. K.	Ashton Gifford House, Codford, Bath	1	0	0
Harding, Webber	Highercombe, Dulverton	1	0	0
Hardinge, Viscount	South Park, Penshurst	1	1	0
Hardwick, E. A.	Newtons, Kewstoke, Weston-super-Mare	1	0	0
Hardy, C.	Gittisham, Honiton	1	1	0
Harford, W. H.	Old Bank, Bristol	1	0	0
Harris, Nicholas	Shernick, Launcells, Holsworthy	0	10	0
Harrison, G.	Underpark, Lealholm, Grosmont, Yorks	1	0	0
Harrison, McGregor & Co.	Leigh, Lancashire.	1	0	0
Harrod, C. D.	Allesford, Taunton	1	0	0
Hassell, J.	Inglescombe, Bath	1	0	0
Hathaway, G.	Royal Prize Churn Works, Chippenham	1	0	0
Hawkes, T.	Williton, Taunton	1	0	0
†Hawkins, J. Heywood	Bignor Park, Petworth	..		

Name.	Residence.	Subscriptions. £	s.	d.
:ins, Rev. J. B. H.	Rectory, Chelwood, Bristol.	1	0	0
don, Lieut.-Col. W. H.	102, Sydney Place, Bath	..		
s, F. J.	West Pennard, Glastonbury	1	0	0
es, J. G.	The Briars, Sanford Churchill, Bristol	1	0	0
er, Sir A., Bart., M.P.	Trevina, Tintagel, Cornwall	1	0	0
er-Hames, C. G.	Chagford, Newton Abbott	1	0	0
rard, W.	Boyd's Farm, Corsham	1	0	0
l, J.	Dorchester	1	0	0
l, H.	Shepton Mallet	1	0	0
nan, A.	Calceto, Arundel	1	0	0
nan, J. E.	Ecclesden Manor, Angmering, Arundel	1	1	0
thcoat-Amory, Sir J. H., art.	Tiverton, Devon	2	2	0
ncoat-Amory, J. M.	Knightshayes, Tiverton	1	0	0
itch, W. B.	Stratton, Ilminster	1	0	0
e, Captain Burchell	Bishopstrow House, Warminster.	1	0	0
r, Major G.	Poundisford, Taunton	1	0	0
nderson, W.	Berkley House, Frome	..		
on, F. R.	Morebath, North Devon	1	0	0
ert, Thomas	Even Farm, Cirencester	1	0	0
s, F. W.	Langford, R.S.O., East Som.	1	0	0
esbury, Lord.	Heytesbury, Wilts	1	0	0
n, W. P.	The Castle, Barnstaple	1	0	0
, B. H.	Belluton House, Pensford, Bristol	..		
, Charles	Clevedon Hall, Somerset	..		
, Col. E. S., C.B.	Rookwood, Llandaff	..		
Edward	Evercreech, Bath	1	0	0
E.	Stratton House, Evercreech, Bath	1	0	0
Sidney	Langford House, Langford, R.S.O.	1	1	0
rd, J.	Church Farm, Charlton Musgrove, Wincanton	1	0	0
nan, J.	3, Gracechurch St., London, E.C.	1	0	0
-Haycock R. W.	Belmont, Sidmouth	1	0	0
isley, Edwin	Wells, Somerset	1	0	0
pisley, J. H.	Stone Easton, Old Down, Bath	..		
ock, A., jun.	Manor Farm, Motcombe	1	0	0
ock, E.	Ashley Farm, Marnhull, Dorset.	1	0	0
re, C. A. R.	37, Fleet Street, London	2	2	0
re, C.	37, Fleet Street, London	2	0	0
re, W.	Staplehurst	2	0	0
house, H., M.P.	Hadspen House, Castle Cary	2	0	0
kin, Edward	Poughill Vicarage, Stratton, Cornwall	..		
ler, S. H.	Montacute, Ilminster	1	0	0
linott, E.	Stratton St. Margaret, Swindon	1	0	0
linott, S.	Worminster Farm, Shepton Mallet	1	0	0
dgson, J. Stewart	Lythe Hill, Haslemere, Surrey	..		
George	Corton Denham, Sherborne	0	10	0

5)

Name.	Residence.	Subscriptions. £ s. d.
Hole, Henry	Poyntington, Sherborne, Dorset	0 10 0
†Holdsworth, Henry M.	Wilton, near Salisbury	..
Holland & Coombs	Bristol	1 0 0
Hollond, J. R.	Wonham, Bampton, Devon	1 0 0
Holmes, E. Carleton	Brookfield, Arundel	1 0 0
Holmström, Pontus	Lundås Gods Edebo, Stockholm	1 0 0
Holt, W. D.	Manor Farm, Castle Cary, Somerset	1 0 0
Hood, Sir A. Acland, Bart., M.P.	St. Audries, Bridgwater	1 0 0
†Hooper, R. N.	Stanshawes Court, Chipping Sodbury	..
†Horner, J. F. Fortescue	Mells Park, Frome	..
Hornsby and Sons (Limited)	Grantham, Lincoln	1 1 0
Horton, J.	Rabson Farm, Winterbourne Bassett, Swindon	1 0 0
Hosegood, Obed., jun.	Dillington, Ilminster	0 10 0
Hosken, W. J.	Carwin Farm, Hayle, Cornwall	1 0 0
Hoskins, H. W.	North Perrott Manor, Crewkerne	1 0 0
Hoskins, Robert.	Beard Hill, Shepton Mallett	1 0 0
How, J. H.	Woodville, Bideford	1 0 0
Howard, E. S.	Thornbury Castle, Glos.	1 0 0
Howard, Hon. Mrs. C.	Dutchlands, Great Missenden	1 0 0
Howard, J. and F.	Britannia Works, Bedford.	1 0 0
Howse, H. J.	London, Gloucester, and N. Hants Dairy Co., Bristol	1 0 0
Howse, John	Stamborough, Washford, Taunton	1 0 0
Hubbard, W. E.	Leonards Lee, Horsham	1 0 0
Hubble, W. L.	Allington, Maidstone	1 0 0
†Hughes, A. E.	Wintercott, Leominster	..
Hughes, James	Wood Lawn, Oxford	1 1 0
Hulbert, T. R.	North Cerney, Cirencester	1 0 0
†Hulse, Sir Edward, Bart.	Breamore, Salisbury	..
*Hulse, E. H., M.P.	Breamore, Salisbury	2 0 0
Humphries, E.	Pershore, Worcestershire	1 0 0
Hunter, J.	Seed Merchant, Chester	1 0 0
†Hurle, J. Cook, jun.	Southfield House, Brislington, Bristol	..
Hurst and Son	152, Houndsditch, London	1 0 0
†Hussey, Col.	Highcliffe, Lympstone, Devon	..
Hussey, John Richards	Beechcroft, St. Davids, Exeter	0 10 0
Hutchings, R. R.	High Street, Wincanton	1 0 0
Huth, L.	Possingworth Manor, Waldron, Sussex	1 0 0
*Hylton, Lord	Charlton, near Radstock	2 2 0

Name.	Residence.	Sub-scriptions. £	s.	d.
ıester, Earl of	Melbury, Dorchester	. .		
t-Terry, H. M. . . .	Woodlands, Kennford, near Exeter	1	0	0
ɔn, Lieut.-Col. R. B. .	Steyning, Sussex	1	1	0
, J.	Merton, Surrey	1	0	0
d, J. C. C.	Brislington Hall, near Bristol . .	1	1	0
Kidman, and Watts. .	57, Corn Market St., Oxford . .	1	0	0
on, Sir H. M., Bart. . .	Llantillio Court, Mon.	1	0	0
on, W.	Manor House, Dawlish, Devon .	1	0	0
;, Alfred B.	Shovell Hill House, North Petherton, Bridgwater	1	1	0
;, E.	5, Devonshire Buildings, Bath .	1	0	0
is, W. H.	Hill End, Henbury, near Bristol	1	0	0
n, S. W.	Liskeard, Cornwall	0	10	0
ɜy, Earl of	Middleton Park, Bicester, Oxon .	2	0	0
' Sanitary Compounds npany	Cannon Street, London, E.C. . .	1	0	0
.s, F. N.	Crishall Grange, Saffron-Walden	. .		
s, George	Ickleton, Saffron-Walden . .	. .		
s, Henry Parr . . .	Portway House, Warminster . .	. .		
, Major F. J.	Chippenham	1	0	0
, Winslow	Exeter	1	1	0
', A. J.	Chippenham	1	0	0
J. R.	Chewton Farm, Ston Easton, Bath	1	0	0
;, James B. and Co. . .	*Journal* Office, Bath	1	0	0
l, C.	Blagdon Stud Farm, Malden, Surrey	1	0	0
l, J. V.	Shaw Farm, Melksham	1	0	0
.nd Co.	Gloucester	1	0	0
ıle, C. A.	East Wood, E. Harptree, Blagdon, R.S.O.	1	0	0
le, Henry	Overtown, Swindon, Wilts . .	1	0	0
p, L. J.	Macr Farm, Exmouth	. .		
ırd, Rev. R. B. . . .	Marnhull Rectory, Blandford. .	1	0	0
ıway, Sir J. H., Bart., ?.	Escot, Ottery St. Mary. . . .	1	1	0
ɜdy, D.	The Forbury, Reading	1	0	0
lewell, W. W. . . .	East Harptree Court, Bristol . .	. .		
r, Edwin	Cothelstone Manor, Taunton . .	1	0	0
r, John	Nynehead, near Wellington, Som.	1	0	0
, R. H.	Farrington Gurney, Bristol . .	1	0	0
rsley, E. L.	Clyffe, Dorchester	1	0	0
R. Moss	Ashcott Park, Bridgwater . . .	1	0	0
ınd Son, R.	Milsom Street, Bath	1	0	0

)

Name.	Residence.	Subscriptions. £ s. d.
King, Sir Wm. D.	Lynwood, Waverley Rd., Southsea	0 10 0
Kingscote, T.	The Trench, Tonbridge	1 0 0
Kinneir, H.	Redville, Swindon	1 0 0
Kivell, W. T.	Pyeworthy, Holsworthy	1 0 0
Knapman, A.	Loxbeare, Tiverton	0 10 0
Knatchbull, W.	Bodreau, Truro	1 0 0
†Knight, Sir F. W., Bart.	Simonsbath, South Molton	..
Knight, R.	Luccombe, Minehead	1 0 0
Knightley, Rev. H. F.	Wasperton, Warwick	1 0 0
†Knollys, C. R.	Fitzhead Court, Taunton	..
†Kruse, W.	Leeds, near Maidstone	..
†Lake, C.	Oakley, Higham, Kent	..
Lakeman, Thos.	Brixham, Devon	0 10 0
Lambert, G., M.P.	Spryton, North Devon	1 1 0
Lamoreaux, G.	6, Bovingdon Villas, Plympton	1 1 0
Lamport, Messrs. C.	Bindon House, Wellington	1 0 0
Lance, C. E.	Stoke Court, Taunton	1 0 0
Lane, A. P.	Plas Power, Wrexham	1 1 0
Langley, B. W.	King's Lynn, Norfolk	1 0 0
Langworthy, W. F.	Clevedon, Somerset	1 0 0
Lankester and Co.	110, Southwark Street, London	1 0 0
*Lansdowne, Marquis of	Bowood, Calne	2 0 0
Lanxon, W.	Lostwithiel, Cornwall	1 0 0
Lascelles, Rev. E.	Newton St. Loe, Bristol	1 0 0
†Latham, T.	Little Wittenham, Abingdon	..
Laurie, Colonel R. P., C.B.	55, Eaton Place, London	1 0 0
*Laverton, W. H.	Leighton House, Westbury, Wilts	2 0 0
Lawrence, J. H. H.	1, Lynwid Villas, Bath	1 1 0
Leach, R.	Half Moon Hotel, Yeovil	1 0 0
Lear, Henry	Copse Grove Farm, Lypiatt Park, Stroud, near Bisley, Gloucestershire	1 0 0
Le Brocq, Francis	St. Peter's, Jersey	1 0 0
*Leconfield, Lord	Petworth, Sussex	2 0 0
Lee, Major-Gen. H. H.	The Mount, Dinas Powis, near Cardiff	1 0 0
Legg, E. Gapper	Melplash Court, Melplash, Dorset	1 0 0
Legg, Job	Bridport, Dorset	1 1 0
Leir, Lt.-Col. W.	Combe Head, Bampton, N. Devon	1 0 0
Leney, H.	Court Lodge, West Farleigh, Kent	1 1 0
*Lennard, Col. Sir J. Farnaby, Bart.	Wickham Court, West Wickham, Kent	3 0 0
Lethbridge, Charles	Sherfield Manor, Basingstoke	1 0 0
†Lethbridge, J. C. Baron	Tregeare, Launceston	..
*Lethbridge, W.	Courtlands, Lympstone	2 0 0

Name.	Residence.	Subscriptions. £	s.	d.
Leverton, W.	Woolleigh Barton, Beaford, North Devon	0	10	0
Lewis, James	Plasdraw, Aberdare	1	1	0
Lewis, Wm. and Son	*Herald* Office, Bath	1	1	0
†Ley, John Henry	Trehill, Exeter	..		
Liddon, E., M.D.	Silver Street House, Taunton	1	0	0
Lipscomb, G.	Frogholt, Hythe, Kent	1	0	0
Lipscomb, R. H.	East Budleigh, Budleigh Salterton, Devon	1	1	0
†Lisburne, Earl of	Crosswood, Aberystwith, S. Wales	..		
†Lister, J. J.	Warninglid Grange, Haywards Heath	..		
Lister, R. A., and Co.	Dursley, Gloucestershire	1	1	0
†Llangattock, Baron	The Hendre, Monmouth	..		
Llewellyn, Evan H.	Langford Court, Langford, Bristol	1	1	0
*Llewelyn, Sir J. T. D., Bart.	Penllergare, Swansea	2	2	0
Lloyd, Herbert	Plas Cilybebyll, Swansea	1	1	0
Lloyd, J. B.	Wilmington Hall, near Dartford	1	0	0
Lock, J. C.	Saltford, near Bristol	1	0	0
Lock, M.	Chancellor's Farm, Wrington, Bristol	1	0	0
Locke, A. C. E.	Northmoor, Dulverton	1	0	0
Locke, R. G. E.	Hartlip, nr. Sittingbourne, Kent.	1	0	0
Londesborough, Earl of	Londesborough Park, Market Weighton	1	0	0
Long, J.	Stanbridge Hall, Romsey, Hants.	1	0	0
*†Long, Walter H., M.P.	Rood Ashton, Trowbridge	..		
Long, Col. William	Woodlands, Congresbury, Somerset	1	0	0
Long, G.	Ogbourne St. Andrew, Marlborough	1	0	0
Look, E.	East Chinnock, Yeovil	1	0	0
Look, G.	Sutton, Evercreech, Bath	1	0	0
*Lopes, Sir M., Bart.	Maristow, Roborough, Devon	2	0	0
Lopes, H. Y. Buller	Maristow, Roborough, Plymouth.	1	0	0
Louch, E. Q.	Langport	1	0	0
Lovelace, Amos	Winsford, Dulverton	0	10	0
Lovelace, Earl of	Ashley Coombe, Porlock, Somerset	1	0	0
†Lubbock, Sir John, Bart., M.P.	High Elms, Hayes, Kent	..		
Lushington, E. H.	Treasurer's House, Guy's Hospital, London	1	0	0
†Lutley, J. B.	Brockampton, Worcester	..		
Luttrell, Rev. A. H. F.	Minehead, Bridgwater	1	0	0
Luttrell, G. F.	Dunster Castle, Somerset	1	0	0
*†Luttrell, Col. H. A. F., C.B.	Badgworth Court, Axbridge, R. S. O., Somerset	1	0	0
*MacAndrew, J. J.	Lukesland, Ivybridge	2	0	0
Mackenzie, Lewis	Tiverton, Devon	1	0	0

Name.	Residence.	Subscriptions. £ s. d.
Macleay, Col. A. C.	Glasshayes, Lyndhurst	1 0 0
Major, H. J., and C. (Limited)	Bridgwater	1 0 0
Mallock, Richard, M.P.	Cockington, Torquay	1 0 0
Manchester, J.	St. John, New Brunswick, Canada	1 0 0
Manfield, J.	Hambridge, Curry Rivell, Taunton	1 0 0
†Mansell, A. E.	Astol, Shifnal, Salop	. .
Marker, Richard	Combe, near Honiton	1 0 0
Marshall, Sons, and Co.	Britannia Iron Works, Gainsboro'	1 1 0
Marshall, W.	Lunstone, near Bude	0 10 0
Marsh, W. S.	Pen-y-bedd, Pembrey	1 0 0
Marsh, Son and Gibbs	Box, Wilts.	1 0 0
Martin, Christopher	Broad Clyst, Exeter	0 10 0
†Martin, G. E.	Ham Court, Upton-on-Severn	. .
Martin, Sydney J.	Whaddon Farm, Lamyat, Bath	1 0 0
Martyn, G.	Managing Director, Western Counties Agricultural Co-operative Association, Plymouth	1 0 0
Mason, A.	North Hill, Swansea	1 0 0
*Mason, J.	Eynsham Hall, Oxon	2 0 0
Mathews, Ernest	The Grove, Northaw, Potters' Bar	1 0 0
Matthews, A. T.	Lingfield, Surrey	1 0 0
Maule, M. St. John	Chapel House, Bath	1 0 0
May, A. C.	Park House, Cotham Park, Bristol	1 0 0
May, W. J.	Farleigh Farm, Tiverton	1 0 0
†Mayo, Henry	4, Temple Terrace, Dorchester	. .
†Mayo, John	Wavey House, Upwey, Dorchester	. .
McMurtrie, J.	Southill, Radstock, near Bath	1 0 0
McNiven, Rev. C. M.	Perrysfield, Oxted, Redhill	1 1 0
Meade, F.	Langport, Somerset	1 0 0
Medland, R.	Penstone, Cullompton	1 0 0
Medland, W. R.	Yard Farm, Silverton, Cullompton	0 10 0
Medlicott, Henry E.	Potterne, Devizes	1 0 0
Merry, Richard	Goulds, Broad Clyst, Exeter	0 10 0
Merry, W. F.	Ash Clist, Broadclist, Exeter	1 0 0
Merson, R. C.	Maristow Cottage, Roborough, S. Devon	1 0 0
Merson, Thomas	Holcombe Rogus, Wellington, Somerset	0 10 0
Methuen, Major-Genl. Lord, C.B., C.M.G.	Corsham Court, Wilts	1 0 0
Micklem, H.	Rose Hill, Henley-on-Thames	1 0 0
Middleton, Hastings N.	Bradford Peverell, Dorchester	1 0 0
Middleton, H. B.	Bradford Peverell, Dorchester	1 0 0
Mildmay, Capt. C. B. St. J.	Hallam, Dulverton	1 0 0
Mildmay, Rev. A. St. J.	Hazlegrove, Sparkford, Bath	1 1 0
*†Mildmay, Sir H. St. John, Bart.	Dogmersfield Park, Hartford Bridge, Winckfield	. .
Mildon, W. B.	Sussex House, Wellington, Somerset	0 10 0
†Miles, H. R.	Abbots Leigh, Clifton, Bristol	. .
Millard, H.	Shrivenham, Berks	1 0 0

Name.	Residence.	Subscriptions. £	s.	d.
A.	Efford Down, Bude Haven, Cornwall	1	0	0
n, T. S.	Montford, Shropshire, R.S.O. . .	1	0	0
ouse, Henry	St. George's Hill, Easton-in-Gordano	1	1	0
hell, F. J.	Llanfreckfa Grange, Carleon, Mon.	.	.	
·, A. G. D.	Warner, Bath	1	1	0
-Bretton, Lord. . . .	8, Seamore Place, London. . .	1	1	0
ıgu, Lord	Palace House, Beaulieu, Hants . .	1	0	0
›fiore, Sir F., Bart. . .	Worth Park, Crawley	1	1	0
y, C.	Pylle, Shepton Mallet	1	0	0
:, Frank R.	Littlecott, Upavon, Marlborough, Wilts	1	0	0
re, H. F.	5, Claremont Road, St. Margaret's, Twickenham	.	.	
e-Stevens, J. C. . . .	Winscott, Gt. Torrington, Devon	5	0	0
:ton, Lord	Sarsden House, Chipping Norton	2	2	0
ın, G. K.	Cherith Lodge, Clifton . . .	1	1	0
ın-Richardson, C. . .	Noyadd Wilym, Cardigan . .	1	0	0
nd, Charles W. . . .	Elmscroft, West Farleigh, Maidstone	1	1	0
nd, J.	Northover House, Glastonbury .	1	0	0
ey, Earl of	Saltram, Plympton, Devon . .	2	0	0
·ell, G. Herbert . . .	Headington Hill Hall, Oxford .	2	2	0
s and Griffin	Elmsdale, Wolverhampton . .	1	1	0
ison, Alfred	Fonthill House, Tisbury . . .	.	.	
nt-Edgcumbe, Earl of . .	Mount-Edgcumbe, Devonport .	2	2	0
nt, G. W.	Wasing Place, Reading	.	.	
tstevens, J.	Railway Hotel, Yatton	1	0	0
›y, Rev. F. L. . . .	91, Kensington Gardens Square, London, S.W.	1	1	0
sey, H. G.	Bathealton Court, Wiveliscombe, Somerset	2	2	0
:low, E..	Castlehead Grange, Lancashire .	.	.	
r, W.	Bruton, Somerset	1	1	0
ns, T.	Aberfeldy, The Shrubbery, Weston-super-Mare	1	0	0
·ck, R.	Newport, Mon.	1	0	0
z, P. A., M.P. . . .	Dunsmore, near Rugby . . .	1	0	0
ch, Jerom	Cranwells, Bath (Mayor, 1864–6, 1876–8, 1887, 1891–3) . . .	2	0	0
ıy-Anderdon, H. Edward	Henlade House, Taunton . . .	1	1	0
leton, Thomas . . .	Beckjay, Ashton-on-Clun . . .	1	0	0

·, Col. W. D.	Stanley Lodge, Exmouth . . .	1	0	0
·r, A.	Heatherton Grange, Bradford, near Taunton	1	0	0
r, H. B.	Chippenham	1	1	0
)				

Name.	Residence.	Subscriptions. £ s. d.
Napper, G.	Lee Farm, Wisboro' Green, Billingshurst, Sussex	1 1 0
†Naylor, C. J.	Kerry, Montgomeryshire	. .
Neame, F.	Macknade, Faversham	1 1 0
Nelder, C. W.	Carnarvon Arms, Dulverton, Somerset	0 10 0
†Neville-Grenville, Robert	Butleigh Court, Glastonbury	. .
Newbery, Samuel P.	Plympton St. Mary, Devon	1 0 0
Newnes, G., M.P.	Hesketh House, Torquay	1 0 0
Newton, F. M.	Barton Grange, Taunton	1 0 0
Newton, F. W.	Barton Grange, Taunton	1 0 0
†Newton, J. G.	Millaton House, Bridestowe, Okehampton	. .
Nicholets, J. T.	Manor House, Brent Knoll, Bridgwater	1 0 0
Nichols, George	Broad Street, Bristol	1 0 0
Nix, Mrs. S.	Tilgate, Crawley, Sussex	1 0 0
Nock, E.	Brockton House, Shifnal, Salop	1 0 0
Noel, Capt. G. T.	East Hayes, Shaftesbury	1 0 0
*Normanton, Earl of	Somerley, Ringwood, Hants	2 0 0
Norris, Charles	Mosshayne, Clyst, near Exeter	1 0 0
Norris, T. F.	Highbridge, Somerset	1 1 0
Norrish, Thomas	Churchill Farm, Loxbeare, Tiverton	0 10 0
Northcote, Hon. Sir S. H., Bart., M.P.	7, Seamore Place, Mayfair, London	1 0 0
*Northumberland, Duke of	Albury Park, Surrey	5 0 0
Nuttall, Joseph	19, Longfield, Heywood, Lancashire	1 0 0
Okeden, Col. U. P.	Turnworth, Blandford	1 0 0
Olde, J. C.	Grove, Launcells, Holsworthy	0 10 0
Oliver-Bellasis, Captain	Shilton House, Coventry	1 1 0
Oliver, J.	Berkeley, Gloucester	1 0 0
Osborn, J.	Chesterblade, Shepton Mallet	1 0 0
Oxley, J. Stewart	Fen Place, Turner's Hill, Sussex	1 1 0
Ozanne, A. T.	Putron, Guernsey	1 0 0
Page, Henry	Walmer Court, Walmer	1 1 0
*Paget, Col. Sir R. H., Bt., M.P.	Cranmore Hall, Shepton Mallet	2 0 0
Pain, Charles	Longstock, Stockbridge, Hants	1 1 0
Palairet, H. H.	Cattistock Lodge, Dorchester	1 1 0
Palfreman, L.	Ingrams Farm, Loxbeare, Tiverton	0 10 0
Palmer, Geo.	Marlston House, Newbery, Berks	1 0 0
Palmer, G. W.	Elmhurst, Reading	1 0 0
†Palmer, R.	Lodge Farm, Nazeing, Waltham Cross	. .
Palmer, W. I.	Hillside, Reading	1 0 0
Parfitt, J.	Selwood Dairy, Frome	1 0 0

Name.	Residence.	£	s.	d.
r, Admiral	Delamore House, Ivybridge . .	1	0	0
er, Hon. Cecil J.. . . .	Eaton Estate Office, Eccleston, Chester		. .	
r, H. C. G..	Alcester Park Farm, Warwickshire	1	0	0
r, J. S.	Freelands, Iffley, Oxford . . .	1	0	0
r, T.	High Street, Shepton Mallet . .	1	0	0
n, Paxton William . .	3, Major Terrace, Seaton, Devon.	1	0	0
niter, Wm	The Axe, Crewkerne		. .	
ll, T. P.	Wrington, R.S.O., Somerset . .	1	0	0
gton, M. B.	Holborough Cottage, Rochester .	1	0	0
, Major J. H.	Bampton, North Devon. . . .	1	0	0
, T.	Newport, Mon.	1	0	0
ons, Henry	Misterton, Crewkerne		. .	
idge, S. J.	Selworthy, Taunton	1	0	0
ck, E.	14, Union Street, Bath. . . .	1	0	0
, W. B.	Southstoke, Bath.	1	0	0
Edw. L.	The Dairy, Melton Constable, East Dereham, Norfolk . . .	1	0	0
am-Clinton-Hope, Lord F. H.	The Deepdene, Dorking . . .	2	0	0
er, G. H.	Tangier Park, Basingstoke . .	1	0	0
broke, Earl of. . . .	Wilton House, Salisbury . . .	2	0	0
arves, W. Cole . . .	Pendarves, Camborne, Cornwall .	1	1	0
y, Thomas	Taunton	1	0	0
val, E. A.	Severn House, Henbury . . .	1	1	0
y-Herrick, Mrs. . . .	Beau Manor Park, Loughborough		. .	
rs, Wm. Parsons . . .	North Cadbury, Bath		. .	
rick, R.	Acland Barton, Landkey, Barnstaple	0	10	0
y, J. McLeod	Greenhouse, Bridgnorth . . .	1	1	0
ifer, T. Valentine, R.C.V.S.L.	Crudwell, Malmesbury	1	0	0
, Capt.	Pendoggett, Timsbury, near Bath	1	1	0
lips, C. D.	Newport, Monmouth		. .	
s, C. N. P.	Chalcot, Westbury	1	0	0
s-Hornby, Capt. G. S.	Sandley House, Gillingham, Bath	1	0	0
ix Oil Mills Co. . . .	Norfolk Street, Liverpool . . .	1	1	0
ley, Sims, and Co., Lmtd.	Bedford Foundry, Leigh . . .	1	0	0
tt Brothers and Co. . .	59, Bishopsgate Street Without, London	1	0	0
t, Cecil S.	Weston-super-Mare	1	0	0
kney, Erlysman C. . .	Berwick St. James, Salisbury .		. .	
y, F.	The Grange, Somerton, Somerset.	1	0	0
ey, R. W.	Somerton, Somerset		. .	
ey, W..	Somerton, Somerset		. .	
ck, W.	Littleworth House, Wantage . .	1	0	0
Thomas, jun.	Southside Street, Plymouth . .		. .	
more, Lord	Poltimore Park, Exeter. . . .	3	3	0
ele, Thos. R..	Polwhele, Truro	1	1	0
S.	Blandford, Dorset	1	0	0
ord, T.	Minehead, Somerset.	1	0	0
r, E.	9, 10 and 11, Queen Square, Bath .	1	0	0

Name.	Residence.	£	s.	d.
Poole, A. R.	12, Chester Place, Hyde Park Square, London, W.	1	0	0
Pope, Alfred	Dorchester	1	0	0
Pope, Henry	Cotleigh Court, near Honiton, Devon	1	0	0
Pope, John	The Shrubbery, Barnfield, Exeter	1	0	0
†Pope, Rev. W. J. P.	Godmanstone Rectory, Dorchester	..		
Porch, J. A.	Edgarley, Glastonbury	1	0	0
*Portal, Melville	Laverstoke House, Micheldever	2	0	0
Portal, Wyndham	Malshanger, Basingstoke	1	0	0
†Porter, R.	Denewood, Broadlands Road, Highgate, London, N.	..		
†Portman, Hon. C. B.	Bryanston, Blandford	..		
†Portman, E. W. D.	Durweston, Blandford	..		
*Portman, Viscount	Bryanston, Blandford	5	0	0
Potter, F. P.	Gate Works, King's Lynn	1	0	0
Poulett, The Earl	Hinton St. George, Crewkerne	1	0	0
Powell, Miss	Maesgwynne, Whitland, S. Wales	1	0	0
Powell, R. H.	Lewes, Sussex	1	0	0
Powell, W. S.	Eglwysnunyd, Taibach	1	0	0
*Poynder, Sir J. Dickson, Bart., M.P.	Hartham Park, Corsham	2	0	0
Prall, G. Wilkinson	Molesey House, Rochester	1	0	0
Pratt, Chas.	Wescot, Tallaton, Ottery St. Mary	1	0	0
Pratt, J. D.	Pratts Hayes, Exmouth	1	0	0
*Prior, R. C. A.	Halse House, near Taunton	2	0	0
Proctor, H. and T.	Cathay, Bristol	1	1	0
Pulley, J.	Lower Eaton, near Hereford	1	0	0
†Purfold, A.	Linnet Lane, Liverpool	..		
Quibell Bros.	Newark	1	0	0
Quicke, Rev. C. P.	The Rectory, Ashbrittle, Wellington	1	0	0
Radmore, Henry T.	Court Barton, Thorverton, Devon	1	0	0
Radway, C. W.	Bath	1	1	0
*Ramsden, J. C.	Busbridge Hall, Godalming	2	0	0
Randall, R.	Canynge House, Clifton Down, Bristol	1	0	0
Ransome, James Edward	Orwell Works, Ipswich	1	1	0
Rashleigh, Jonathan	Menabilly, Par Station, Cornwall	1	0	0
Rawlence, Ernest A.	Newlands, Salisbury	1	0	0
Rawlence, James	Bulbridge, Wilton, Salisbury	1	1	0
Read, B.	New Barn Farm, Keynsham	1	0	0
Read, J. K.	Berwick Farm, Hindon, Salisbury	1	0	0
Reakes, P.	Hill House, Lipyeate, Holcombe, Bath	1	0	0

Name.	Residence.	Subscriptions. £	s.	d.
V J.	Swansea	1	1	0
okes, C. W.	Town Clerk, Tenby	1	1	0
, Robert and John, and				
.	Bratton, Westbury, Wilts	1	0	0
.	Livingshayes, Silverton	1	0	0
'. V. A.	Spring Grove, Milverton	1	0	0
e, Robert	Catel Farm, Guernsey	..		
ond and Gordon, Duke				
.	Goodwood, Chichester	5	0	0
'd, Silas	Newlyn East, Grampound Road, Cornwall	1	0	0
James	Blackford, Selworthy, Minehead	1	0	0
T. K.	Minehead, Taunton	1	0	0
T.	Sutton Weaver, viâ Warrington, Cheshire	1	0	0
, Henry	Lyminge, Hythe, Kent	1	0	0
, Gen. Fox Pitt.	Rushmore Lodge, Ludwick, Salisbury	2	0	0
tes, Lord	Lanhydroc, Bodmin	2	0	0
, J. D. Cramer	Highfield, Frant, Tunbr. Wells	1	1	0
, J., and Son	Bridgwater	1	1	0
, Lt.-Col. W. H.	Holborough Park, Rochester	1	0	0
J.	High Bray, South Molton	0	10	0
n, S.	Lynhales, Kington, Herefordshire	1	0	0
n, John, and Co.	Bristol	1	1	0
n, W. J.	Yatton Keynell, Chippenham	1	1	0
'.	Gratton, High Bray, S. Molton	1	0	0
', James	West Town, R.S.O., near Bristol	1	0	0
ild, Lord	Tring Park, Herts	1	0	0
Guernsey Agricultural				
Horticultural Society	Guernsey	1	0	0
, H. J.	West Street Schools, Bridgwater	1	0	0
L. H.	Sherborne	0	10	0
G. S.	Greenhill Farm, Sutton Veney, Warminster	1	0	0
T. S.	Upton Lovell, Corton, Bath	1	0	0
and Proctor	Sheaf Iron Works, Lincoln	1	0	0
.	North Cadbury, Bath	1	0	0
ry, T. H.	Beckington Rectory, Bath	1	0	0
Germans, Earl of	Port Elliott, St. Germans, R.S.O. Cornwall	3	3	0
r, Lord P.	Maiden Bradley, Bath	1	0	0
, H. C.	North Fields, Bridgwater	1	0	0
, W.	Yonder Broadpool Farm, Doulting, Shepton Mallet	1	0	0
Benjamin	Newlands, Broad Clyst, Exeter	1	0	0
on, Sir B., Bart., M.P.	Banbury	1	0	0
on, Ernest	Bodicote Grange, Banbury	1	0	0
on and Co.	Britannia Works, Banbury	1	0	0
E. A.	Stoke House, Exeter	1	0	0

Name.	Residence.	Subscriptions. £ s. d.
†Sanders, E. J.	Stoke House, Exeter	..
Sanders, Rev. L.	Rectory, Whimple, Devon	1 0 0
Sanders, T.	Conroy, Broad Clyst, Exeter	1 0 0
Sandvey, H. Poole	Launcells, Holsworthy	0 10 0
Sanford, E. C. A.	Nynehead, Wellington, Somerset	1 1 0
Sanford, W. A.	Nynehead, Wellington, Somerset	1 0 0
Saunders, C. M.	Boracott, Brandiscorner, N. Devon	1 0 0
Saunders, J.	Sutton, Cranborne, Dorset	1 0 0
Saunders, Thomas Chapman	Watercombe Farm, Dorchester	1 0 0
Savidge, M.	Sarsden Lodge Farm, Chipping Norton	1 1 0
Savile, Col. H. B. O.	4, Rodney Place, Clifton	1 1 0
Scanes, H. J.	West Wood, Broad Clyst, Exeter	0 10 0
Scanlem, J. O'Hara	Kerswell, Broadclyst, Exeter	1 0 0
*Scobell, Col. Barton L. J.	Kingwell Hall, High Littleton, near Bristol	2 2 0
†Scott, T.	Ditton Court, Maidstone	..
*Scratton, D. R.	Ogwell, Newton Abbott	2 2 0
Search, Miss B.	Cowie, Stonehaven, N.B.	1 0 0
Searle, J.	Legonna, Newquay, Cornwall	1 0 0
†Seaton, Lord	Nutwell Court, Lympstone, Devon	..
Senior, H.	Rushton, Blandford, Dorset	1 0 0
Seward, Samuel N.	Weston, near Petersfield, Hants	1 0 0
†Seymour, R. A. H.	46, Earl Street, Maidstone (Hon. Local Sec., 1884)	..
Shackell, R.	Lower Swainswick House, Bath	1 0 0
Shakerley, H. W.	The Hall, Fairlight, Hastings	1 0 0
Shaw, Rev. G. F. E.	Edgworth Rectory, Cirencester	1 0 0
†Shaw, Stewart Walter R.	Berwick House, Hindon, Salisbury	..
Shelley, Sir John, Bart.	Shobrooke Park, Crediton	1 1 0
Sheppy, J.	Inwoods House, Congresbury, Bristol	1 0 0
†Sherston, Major C. D.	Driscoe House, Bruton, Bath	..
Sherston, Capt. J. D.	Evercreech, Bath	1 0 0
Shore, J. H.	Whatley House, Frome	1 0 0
Sillifant, A. O.	Coombe House, Coppleston, N.D.	1 0 0
Sim, W. C.	Knowle, Clyst St. George, Topsham	1 1 0
Simmons, Chas. John	Langford, Somerset	1 1 0
†Simmons, Henry	Bearwood Farm, Wokingham	..
Simpson, F. C.	Maypool, Churston Ferrers, R.S.O., S. Devon	1 0 0
*Simpson, Geo.	Wray Park, Reigate	2 0 0
*†Singer, A. M.	Redworth, near Totnes	..
Singer, John J.	Belcombe Farm, Bradford-on-Avon	0 10 0
*Singer, W. M. G.	Streatfield, Paignton, Devon	5 0 0
Skinner, A.	Bratton Fleming, Barnstaple	0 10 0
Skinner, A. C.	Pound Farm, Bishop's Lydeard, Taunton	1 0 0
*Skrine, Henry Duncan	Claverton Manor, Bath	2 0 0
Skrine, H. M.	Warleigh Manor, Bath	1 1 0

Name.	Residence.	Sub-scriptions. £	s.	d.
A. H.	Pall Mall Club, Waterloo Place, London	1	0	0
, G. E.	Combe Hay Manor, Bath	1	0	0
h, Hon. W. F. D., M.P.	Greenlands, Henley-on-Thames	5	0	0
, H. J.	Stoke Abbott, Beaminster, Dorset	1	0	0
ı, Hugh C.	Mount Clare, Roehampton	1	1	0
h, J. W.	Thinghill Court, Hereford	..		
, Joseph	East End House, Warminster	1	0	0
h, S. Lee	Larkfield, Maidstone	..		
, W.	Sundon House, Clifton Down, Bristol	1	0	0
, W. H.	West Newton, Bridgwater	1	0	0
'th, Sir J. H. Greville, t.	Ashton Court, Bristol	..		
en, W.	Corscombe, Dorchester	1	0	0
Edmund	The Quarries, Exeter	1	0	0
·, J.	Broadclyst, Exeter	1	0	0
·rset, Duke of	Maiden Bradley, Bath	2	0	0
·rville, A. F.	Dinder House, Wells	..		
kman, Henry	Bath	..		
·man, Sir J., Bart.	Llansannor Court, Cowbridge	..		
, W. S.	Mill Farm, Priston, Bath	1	0	0
, W., jun.	Jordans, Ilminster	1	1	0
·r, J. M.	Oakhill, Bath	1	0	0
·r, S.	Holywell Manor, St. Ives	1	0	0
, Capt. J. W. Gooch	Spye Park, Chippenham	1	0	0
, C.	Manor Farm, Bishops Caundle, Sherborne	1	0	0
Joseph	High Street, Glastonbury	1	0	0
.s' Patent (Limited).	Henry Street, Bermondsey, London	1	0	0
·ay, Rev. Edward	Heathfield, Taunton	1	0	0
·y, E. P.	Salisbury	1	1	0
·rd, A.	Eatons, Steyning, Sussex	1	1	0
·ord, W.	Eatons, Steyning, Sussex	..		
rd, W. H. E.	Frylands, Henfield, Sussex	0	10	0
·pe, Hon. and Rev. B. L. S.	Byford Rectory, Hereford	1	0	0
ey, E. J., M.P.	Quantock Lodge, Bridgwater	2	0	0
, A.	Red House Farm, Stratton-on-the-Fosse, Bath	1	0	0
J.	Yondercott, Uffculme, Devon	1	0	0
·ens, Darell	Trewornan, Wadebridge, Cornwall	..		
·s, W.	Budlake, Broad Clyst, Exeter	1	0	0
Henry	Addington House, Addington, Croydon	1	0	0
, Jas.	Watchet, Somerset	1	0	0
r, G.	High Street, Exeter	1	0	0
, Robert	Burroughs Hill, Salisbury	1	0	0
George	Camerton, Bath	1	0	0
John S.	Clarence Place Works, Newport, Mon.	0	10	0
·Maskelyne, N.	Basset Down House, Swindon	2	2	0

Name.	Residence.	Subscriptions. £ s. d.
†Strachey, E., M.P.	Pensford, Somerset	. .
Stratton, Richard	The Duffryn, Newport, Mon.	1 0 0
*Strickland, A. L.	23, Warwick Square, London, S.W.	2 0 0
Stubs, Peter	Blaisdon Hall, Newnham, Gloucester	1 0 0
Stuckey, Vincent	Hill House, Langport	1 0 0
Stuckey, W. J.	Lambridge Lodge, Bath	1 0 0
*Stucley, Sir G. S., Bart.	Moreton, Bideford	2 0 0
Studdy, T. E.	Leckford Down, Stockbridge	1 0 0
Stunt, Warwick	Abbott Court, Hoo, Rochester	1 0 0
Sturge, William	Bristol	1 1 0
Style, A. F.	Boxley House, Maidstone	1 0 0
Summers, F. B.	Hagloe House, Blakeney, Gloucestershire	1 0 0
Sutton, John C.	Shirley, near Southampton	1 0 0
*Sutton, M. J.	Kidmore Grange, Caversham, Oxon	2 0 0
*Sutton and Sons	(Seedsmen) Reading	2 2 0
Swanwick, R.	College Farm, Cirencester	1 0 0
Swayne, W. T	Glastonbury	1 0 0
Sweet, Rev. L. E.	Hullavington, Chippenham	1 0 0
Talbot, Major-Gen. Fitzroy Somerset	Army and Navy Club, London	1 0 0
Talbot, Miss	Margam Park, Port Talbot	1 0 0
Tangyes (Limited)	Cornwall Works, Birmingham	1 0 0
Tanner, E. F.	Hawson Court, Buckfastleigh	1 0 0
Tanner, J. B.	King's Weston, Shirehampton, Bristol	1 0 0
Tapp, David James	Knaplock, Winsford, Dulverton	1 0 0
Tapp, John	Winsford, Dulverton	0 10 0
Tapscott, H.	13, James Road, Exeter	1 0 0
Tasker, W., and Sons	Andover	1 1 0
Tate, J. A.	Fairfield, Wells, Somerset	1 0 0
Tayleur, C. W.	Hampton, St. Mary Church, Torquay	1 0 0
†Taylor, George	Crauford, Hounslow, W.	. .
Taylor, H. W.	Showle Court, Ledbury, Hereford	1 0 0
†Tazewell, W. H.	Manor House, Taunton St. Mary's	. .
*Temple, Earl.	Newton Park, Newton St. Loe	2 2 0
Thomas, T. C.	The Manor, Weston Bampfylde, Sparkford, Bath	1 0 0
Thomas, W.	The Beam House, Montford Bridge, Salop	1 0 0
Thompson, John	Badminton, Chippenham	1 1 0
Thomson, Col. White	Broomford Manor, Exbourne, N. Devon	1 0 0
†Thorley, Joseph	Thornhill Bridge, Caledonian Road, King's Cross London, N.	. .

Name.	Residence.	Subscriptions. £ s. d.
', C. G.	Curdon Farm, Williton, Somerset	1 0 0
;, J.	West Yard, N. Molton	0 10 0
;, J. G.	Horridge, Romansleigh, S. Molton	0 10 0
;, John	Bradley, Winsford, Dulverton .	0 10 0
.er, John	Corfe Hill, Weymouth	1 0 0
, J. Huntley	Alford House, Castle Cary. . .	1 0 0
:morton, Sir N. W., :t.	Buckland, Faringdon, Berks . .	1 0 0
ne, Lord H.	Muntham, Worthing	2 0 0
. B.	The Park Farm, Thornbury . .	1 0 0
. D..	Morton, Thornbury	1 0 0
Villiam	Treworgan, Ross	1 0 0
W. T. S.	Quaish Farm, N. Woolton, Shepton Mallet	1 0 0
l, A.	Holland Park Dairy, London . .	1 0 0
, W. and Son	Cheese Merchants, Bath . . .	1 0 0
'. W.	Implement Maker, Warminster .	1 0 0
ıer, E. H. A.	Harewood, Plympton St. Mary .	2 0 0
vell, John	Upper Winchendon, Aylesbury .	1 0 0
:gar, Lord	Tredegar Park, Newport, Mon. .	2 2 0
ine, James	Tregonning, St. Columb Minor, Cornwall	1 0 0
ine, W. K.	Trerice, Newlyn, Grampound Road, Cornwall	1 0 0
ine, W. H.	Sherborne, Northleach, Cheltenham	1 0 0
nayne, John	Heligan, St. Austell	. .
·r, W. T.	Degembris North, Newlyn East, Cornwall	0 10 0
.an, E. B. Cely . . .	Port Town, Taunton	1 0 0
l, Col. Robert . . .	Matford, near Exeter	. .
an, E. R.	The Elms, Frome	1 1 0
e, Col.	Huntsham, Bampton, Devon . .	2 2 0
.e-Chaffyn-Grove, G. .	North Coker House, Yeovil . .	. .
r, G. H.	21, Broad Street, Bath	1 0 0
:, H. B.	Bath and Somerset Dairy Company (Limited), Bath . . .	1 0 0
r, R.	Bratton Fleming, Barnstaple . .	0 10 0
r, W. D.	74, High Street, Southampton .	1 0 0
, W.	Leinthall, Ludlow	1 0 0
'ay, C. C.	Cedars, Wells, Somerset . . .	. .
· Brothers	Milsom Street, Bath	1 0 0
', J.	Backwell, Bristol	1 0 0
John	291, Edgware Road, London . .	1 0 0
, L..	Tiverton	1 0 0
ı, W. A.	Batheaston, Bath	1 0 0

Name.	Residence.	Subscriptions. £ s. d.
Vellacott, H. W. Hopper	Stone Farm, Exford, Taunton	1 0 0
Venables, Rev. R. L.	Newbridge-on-Wye, near Builth	1 1 0
Vezey, H. J.	Long Acre, Bath	1 0 0
Vezey, Jas.	The Chequers, Box, Wilts.	1 0 0
Vickress, T. A.	Hill, Slinfold, Horsham	1 0 0
Vipan and Headley	Leicester	1 0 0
Vosper, W. P.	Saltram Farm, Plympton, Devon.	1 0 0
Vowles, J.	Portway Farm, Wells, Somerset.	1 0 0
Wainwright, Charles R.	Shepton Mallet	1 1 0
†Wallace, Major, R.H.A.	Army and Navy Club, London	..
Wait, W. S.	Woodborough House, Bath	1 1 0
Walden, J.	Chilcombe, Bridport	1 0 0
Walker, E. J.	Broad Quay, Bath	1 0 0
Wallis and Steevens	North Hants Iron Works, Basingstoke	1 0 0
Walrond, Sir W. Hood, Bart., M.P.	New Court, Topsham, Devon.	1 0 0
†Walsingham, Lord	Merton Hall, Thetford, Norfolk	..
†Walter, John	Bearwood, Wokingham	..
Wantage, Lord, K.C.B., V.C.	Lockinge Park, Wantage	1 0 0
Waring, H. F.	46, Earl Street, Maidstone	1 0 0
Warne, C. G.	Weston-super-Mare	1 1 0
†Warner, T. C., M.P.	Woodford, Essex	..
†Warre, Frederick	44, Great Ormond Street, Bloomsbury, London	..
Warre, Rev. E., D.D.	Eton College, Windsor	1 0 0
Waterloo Cake Mills Co.	Wilmington, Hull	1 1 0
*Watney, W. D.	33, Poultry, London, E.C.	2 0 0
Watson, James	Melksham, Wilts	1 0 0
Weatherley, L. A., M.D.	Bailbrook House, Bath	1 0 0
Webb, E., and Sons	Wordesley, Stourbridge	1 0 0
Webb, J.	High Street, Kensington, London	1 0 0
Webber, John	West Bagborough, Taunton	0 10 0
Wedmore, F. H..	Red House Farm, Stoke Bishop, Bristol	1 0 0
Welch, C. W.	Lamyat, Bath	1 0 0
Were, J. Kennet	Sidmouth	1 1 0
†*Weymouth, Viscount	Longleat, Warminster	..
†White, A.	Manor Farm, Zeals, Wilts.	..
White, Arthur J.	Wrangaton Manor House, Ivybridge	1 0 0
White, J.	Manor Farm, Zeals, Wilts	1 1 0
White, George	Hunton, Maidstone	1 0 0
White, H.	Stanley, Chippenham	1 0 0
White, J. Bazley, M.P.	21, Ennismore Gardens, London, S.W.	1 0 0
White, J. and Co.	Cheese Merchants, Bristol	1 1 0
*†Whitehead, C., F.L.S.	Barming House, Maidstone	..

Name.	Residence.	Subscriptions. £	s.	d.
ehead, R.	Old Paddockhurst, Worth, Crawley	2	2	0
eld, G. T.	Colebridge, Gloucester	1	0	0
ey, T. W.	Frithfield, Shepton Mallett	1	0	0
ing, C. E.	Sandcroft, Uphill, Weston-super-Mare	1	1	0
ng, E. M.	Totterdown, Uphill, Weston-super-Mare	1	0	0
am, C. E.	Palace Farm, Wells, Somerset	1	0	0
am, W.	Binsted-Wyck, Alton	1	0	0
, J. A.	Oakwood, Maidstone	1	0	0
x, W. H., and Co.	36, Southwark Street, London	1	1	0
x, W. T.	Hampton Hall, Bath	1	0	0
ison Brothers	Union Street, Bath	1	1	0
ison, Capt. G. W.	Risca, Mon.	1	0	0
ison, W.	Bacton Manor, Pontrilas	1	0	0
t, J. S.	Petticombe, Torrington	1	0	0
tt, P. A.	Brighton	..		
n, J. P.	Noyadd, Rhayader	1	0	0
ms, A. G.	St. George's Brewery, Portsea, Hants	1	0	0
ms, Edward Wilmot	Herringston, Dorchester	1	0	0
ms, George	Wick Farm, Winsford, Dulverton	0	10	0
ms, J. C., M.P.	Carhyss Castle, Werrington Park, Launceston	1	0	0
ms, Capt. J.	The Fields, Newport, Mon.	1	0	0
ms, I.	Ormond House, Weston, Bath	1	0	0
ns, J.	Regilbury Park, Winford, Somerset	1	0	0
ams, J. A.	Brideshead, Dorchester	..		
ms, M. H.	Pencalerick, Truro	1	0	0
ams, M. Scott	Woolland House, Blandford	..		
ms, Rev. S. H.	Great Linford Rectory, Newport Pagnell	1	0	0
ams, Robert	Brideshead, Dorchester	..		
ms, R. and Son	Churn Works, Hay, Builth	1	0	0
ams, Sir W. R., Bart.	Heanton, Barnstaple	2	2	0
, John Gale	Newton St. Loe, Bath	1	0	0
, Joseph D.	Bapton, Codford, Wilts	1	1	0
, J.	Berry Barton, Totnes, Devon	..		
William Henry	Blagdon, R.S.O., Somerset	1	0	0
Messrs.	East Wray, Lustleigh, Newton Abbott	1	0	0
ms, Ed. W. Bridges	Nanskeval, St. Columb, Cornwall	1	0	0
n, J. Wilson	Farmers' Club, Salisbury Hotel, Salisbury Sq., Fleet St., London	..		
hester, Marquis of	Amport St. Mary's, Andover	2	0	0
lsor, Lord	Hewell Grange, Bromsgrove	2	0	0
itto	Ditto. (additional)	2	0	0
ield, W. H.	Sutton Park, Sandy, Beds.	1	0	0
r, G.	Chedzoy, Bridgwater	0	10	0
le, R. W.	Old Square, Lincoln's Inn, London	..		
ood, T. H. R.	Wellisford Manor, Wellington, Somerset	1	0	0

)

Name.	Residence.	Subscriptions. £	s.	d.
Wippell Bros. & Row	High Street, Exeter	1	1	0
Wippell, Richard	Rudway, Thorverton	1	0	0
Wish, Thomas	Broadclyst, Exeter	0	10	0
Wodehouse, C. B.	Llwynbedia, near Boncath	1	0	0
Wodehouse, E. R., M.P.	56, Chester Square, London	1	0	0
†Wollocombe, Rev. J. B.	Stowford Rectory, Lewdown, Devon	..		
Wood-Homer, G.	Athelhampton, Dorchester	1	0	0
Wood, Martyn H. G.	*Gazette* Office, Bath	1	0	0
Wood, J. Gaythorne	Thedden Grange, Alton, Hants	1	1	0
Wood, W. A.	36, Worship Street, London, E.C.	1	1	0
Wood, W., jun.	Hassocks, Sussex	1	0	0
Woodroffe & Co.	Albion Iron Works, Rugeley, Staffordshire	1	0	0
Woods, Thomas, Col.	Llandaff Place, Llandaff	1	0	0
Woolcombe, C. B.	Ashbury, Exbourne, N. Devon	1	0	0
Worth, H. M.	Broad Clyst, Exeter	0	10	0
Wright, F.	112, High Street, Cheltenham	1	0	0
Wyatt-Edgell, A., Col.	Cowley House, Exeter	1	1	0
Wyles, J.	Stonehouse Farm, Frindsbury, Rochester	1	0	0
Yalland, J.	Manor House, Fishponds, Bristol	1	0	0
Yatman, Rev. J. A.	Winscombe Hill, Weston-Super-Mare	1	0	0
Young, J.	Pinfold, Sherborne, Dorset	1	0	0
(21) Total . . 1273				

INDEX.

END OF VOL. III.

LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
STAMFORD STREET AND CHARING CROSS.

R. A. LISTER Co., DAIRY ENGINEER

"Alexandra"

'ARATOR

WILL IT PAY TO USE THEM?

YES!

No matter how small or large your number of cows. Separate your Milk directly it comes from the cow. Save all the trouble of setting pans.

You will have new, sweet, warm, skimmed Milk for rearing Calves night and morning (saving your present trouble and expense of heating skimmed milk for calves); a wholesome drink for children, and for making pastry, &c., &c. You will make better butter, and in hot weather

20 PER CENT. MORE

in quantity. All the impurities are removed from the Milk in the process of separation.

PRICES:

Which include free delivery to the principal Irish Ports, Milk-receiving Tin and T supply of small wearing parts, all the usual extras, and packing.

SIZE.		CAPACITY PER HOUR.		
No. 8.	Easy to work for a Lady	—25 gallons	£16	16
,, 7.	,, ,,	Man—50 gallons	£25	0

SUTTON, *August 20th*, 1892.

To MESSRS. H. RICHARDS & SON, Ironmongers, LUDLOW.

GENTLEMEN,—I am very pleased with the No. 8 "Alexandra" Separator which you supplied to I have given it a very fair trial, and find that it does more than you said it would do. I separated whole of my milk (night and morning) for 4 days with it, and the following 4 days set it in the ordin way. From the former I made 59¼ lbs. Butter, from the latter 48¼ lbs., being a clear gain of 11 lbs four days by using the Separator. To be quite sure I also made a second test, both Setting and Separat 350 quarts Milk. From the Milk Set I made 24¾ lbs. Butter, while from the Milk Separated I made lbs. The Calves prefer the Separated Milk, as they have it fresh and warm, and do better on it, an am saved the trouble and expense of heating the water for cleaning the leads, and warming the milk the calves. My son, quite a youth, takes the entire charge of the Separator.

I am, yours truly, JOHN BATTY.

At the R.A.S.E. Great Trials, Doncaster, 1891, the "Alexandr was awarded First Prize of £30, in competition wi all the leading makers of the World.

DURSLEY, ENGLAND.

Established 1840.

Day & Sons, Crewe.

ANIMAL MEDICINE SPECIALISTS.

LARGEST SALE IN THE WORLD

AWARDED OVER 40 PRIZE MEDALS.

DETAILED USES.

Cures quickly Colic and Chills in Horses and Cattle.
Cures Relaxed Bowels, Debility, and Low Condition in Horses and Cattle.
A Matchless Restorer after a hard day's work or hunting.
For All cases where a pain-killer, stimulant, or tonic is required.
For Weakly, Ill-conditioned, or Scouring Foals, Calves, and Lambs.
Instantly relieves Hoven or Blown Cattle and Sheep.

Price 1s. 8d. per bottle, or 19s. per dozen in boxes carriage paid.

THE ORIGINAL

CALVING, LAMBING, AND FOALING CASES.

VETERINARY ADVICE GRATIS BY OUR M.R.C.V.S.

PRICE
£1 1s., £2 2s., £3 3s. & £4 4s.
and upwards.
Carriage Paid.

In ordering please state price, and say if for Calving only, or Lambing only, or for both.

CASH TERMS
FOR ORDERS OF
£2
AND UPWARDS.

Cash with Order less 7½ per cent.
Cash in 14 days less 5 per cent

Illustrated 20-page pamphlet on Calving and Lambing Disorders Gratis.

ONLY ADDRESS—

DAY & SONS, CREWE.